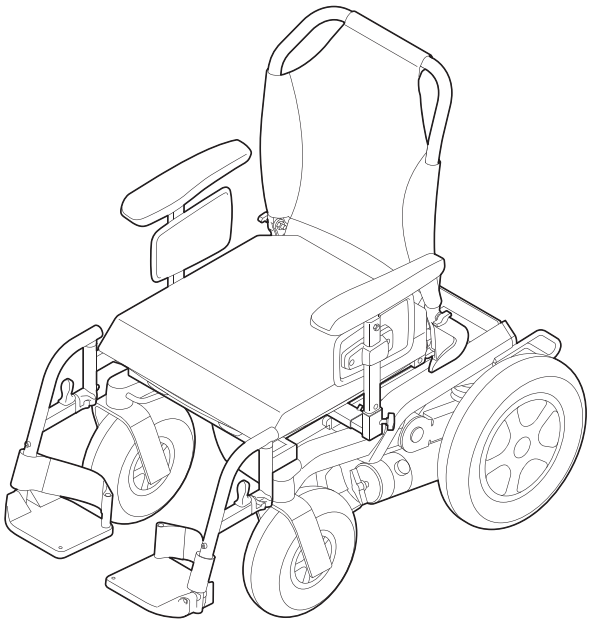
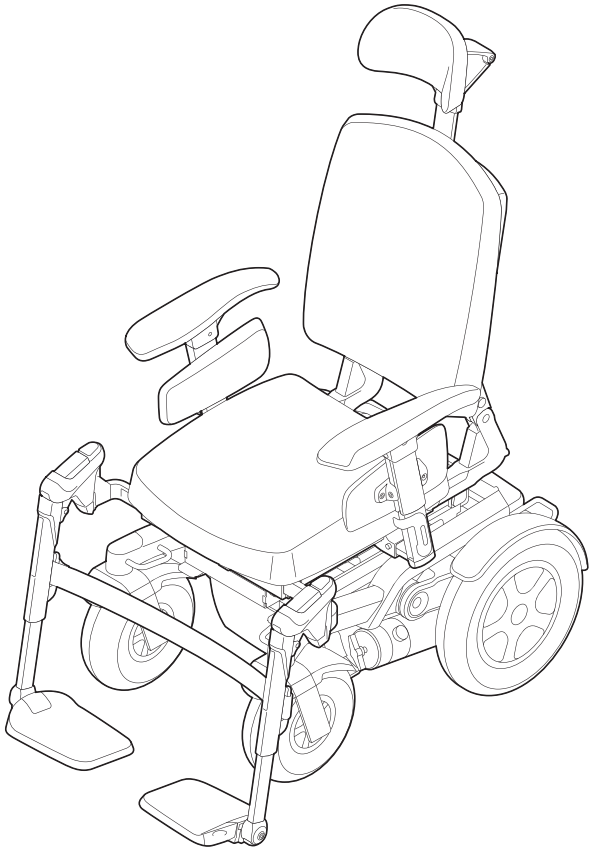
SERVICE MANUAL

PUMA 20/40





CE

handicare

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1 Introduction Service manual Puma 20/40

1.1 This manual

This manual contains the instructions for repairs and general maintenance of the Puma 20/40 motor driven wheelchair.
Mechanics who do repairs on this wheelchair must be well trained and familiar with the repair methods and the maintenance of the Puma 20/40 wheelchair.
Always make sure that the work is carried out safely, particularly with respect to procedures requiring the wheelchair to be lifted up.
We advise that you contact our service department before doing repair work on a wheelchair that has been involved in an accident.
The following specifications are important when ordering parts:

- Model
- Year of manufacture
- Colour
- Identification number
- Part number
- Name of the part concerned

This information is provided on the identification plate. See 'Identification of the product'.

Available documentation
The following technical documentation is available for this wheelchair:

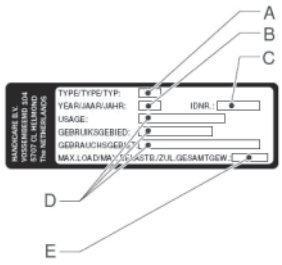
- User manual
- Service manual

Service and technical support
For information concerning specific settings, maintenance or repair works please contact your supplier. He is always prepared to help you.
Ensure you have at hand:

- Model
- Year of manufacture
- Identification number

This information is provided on the identification plate. See 'Identification of the product'.

1.2 Identification of the product



The identification plate contains the following data:

A. Model
B. Year of manufacture
C. Identification number
D. Use area indoors or outdoors
E. Maximum load in kg

1.3 Symbols used in this manual

Warning symbol

Follow the instructions next to this symbol closely.
Not paying careful attention to these instructions could result in physical injury or damage to the wheelchair or the environment.

ATTENTION!

Suggestions and advice that help tasks or procedures involved to be carried out more easily.

Reference symbol

The symbol refers to a separate user manual. This reference will indicate the specific user manual and the section to which is being referred.

Pull the charge cord out of the battery charging connection of the electric wheelchair before carrying out any maintenance on the wheelchair.

2 Safety

2.1 Maximum User weight reduction when Puma 20 options are installed on a Puma 40!

In case one of the following Puma 20 options is installed on a Puma 40 carrier, the maximum user weight is reduced to 136 kg:
- Sedeo Lite Seating System (or any Sedeo Lite component)
- Puma 20 motors
- Puma 20 Comfort suspension
- Puma 20 Electrical tilt adjustment (0 - 25º)

2.2 Personnel qualification

Service technicians:
Repairs may only be carried out by trained and authorised service technicians.
During the execution of their work, they are at all times fully responsible for the fulfilment of locally applicable safety guidelines and standards.
Temporary employees and persons in training may only carry out repair and replacement work under the supervision of an authorised service technician.

2.3 Cautions and warning statements

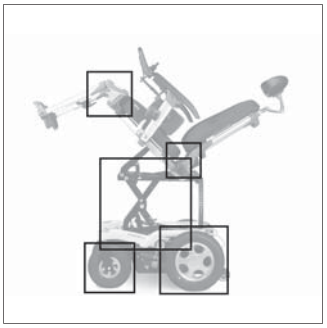
⚠ **Safety**
Safety information is indicated with the warning symbol.

- Follow the instructions carefully next to these warning symbols! Not paying careful attention to these instructions could result in physical injury or damage to the wheelchair or the environment. Where ever possible, safety information is provided in the relevant chapter.

⚠ **Temperature**
- Avoid physical contact with the wheelchair's motors at all times. Motors are continuously in motion during use and can reach high temperatures. After use, the motors will cool down slowly. Physical contact could cause burns.
- If you do not use the wheelchair, ensure that it is not exposed to direct sunlight for lengthy periods of time. Certain parts of the wheelchair, such as the seat, the back and the armrests can become hot if they have been exposed to full sunlight for too long. This may cause burns or allergic reactions to the skin.

⚠ **Interference between carrier and tilt module at the lowest seat height**
Optimizing the different functions in the wheelchair can lead to interference between certain parts. In this case the 45 deg tilt in combination with the lowest seat height can limit the possible degree of tilt. This depends on the Centre of Gravity position of the seating system and the seat depth.
The bigger the seat depth and/or the centre of gravity position going to the rear, the bigger the limit of the tilt angle.
We do not expect this to be a problem since people seated in the chair with the lowest seat height, have a small under leg length and are therefore smaller people in general. The chance that they have a bigger seat depth or a rearward centre of gravity position is limited.
If an interference should appear then this can be solved by:
- Decreasing the seat depth
- Positioning the centre of gravity forward
- Increase the seat height

⚠ **Moving parts**
- A wheelchair has moving and rotating parts. Contact with moving parts may result in serious physical injury or damage to the wheelchair. Contact with the moving parts of the wheelchair should be avoided.
- Wheels (turning and castor)
- Electric tilt in space adjustment
- Electric high/low option
- Electric backrest adjustment
- Electric elavating legrests



⚠ **Electromagnetic radiation**
The standard version of your electric wheelchair has been tested on the applicable requirements with respect to electromagnetic radiation (EMC requirements) In spite of these tests:
- it cannot be excluded that electromagnetic radiation may have an influence on the wheelchair. For example:
- mobile telephony
- large-scale medical apparatus
- other sources of electromagnetic radiation
- it cannot be excluded that the wheelchair may interfere with electromagnetic fields.

For example:
- shop doors
- burglar alarm systems in shops
- garage door openers

In the unlikely event that such problems do occur, we request that you notify your supplier immediately.

⚠ **Decals and instructions on the wheelchair**
Decals and instructions on the wheelchair
- The signs, symbols and instructions affixed to the wheelchair comprise part of the safety facilities. They must never be covered or removed. They must remain present and clearly legible throughout the entire lifespan of the wheelchair.
- Replace or repair all illegible or damaged signs, symbols and instructions immediately. Please contact your supplier for assistance.

2.4 Used decals on the wheelchair

Check manual before using

Freewheel switch in ‘Drive’ mode
Freewheel switch in ‘Push’ mode.
Don’t put the freewheel switch in ‘Push’ mode on a slope

Battery charging connection

Attachment point of the tie-down system for transportation in a vehicle.

Danger of crushing!
Use caution when swinging the controller aside to avoid getting anything crushed.

Trap danger. Danger of getting fingers jammed.

3 Tools, parts and components

3.1 Tools

The tools below are needed for various mechanical settings and maintenance:

Quantity	Description	Size (mm)
1	Screwdriver, medium	5
1	Hammer (plastic)	-
1	Chaser	-
1	Pair of wire cutters	-
1	Circlip pliers	-
1	Water pump pliers	-
2	Open ended spanner	10, 13
2	Ring spanner	10, 13
1	Torque wrench, socket	10, 13
1	Torx key	T30
1	Allen key	4, 6, 8
1	Loctite 243	-
#	Tie wraps	
Remark Size: the EU key width (of the relevant tool).		

⚠ Use only high-quality tools for the adjustment(s) described.
Make sure that the hexagon of the spanner is attached securely to the hexagon of the fastening article. This prevents the 'rotation' of hexagons of fastening articles and spanners that may affect proper adjustment.

3.2 Tools electronics

The following tools are needed for various electronic settings:

Article numbers	Description	DX2	DX	Shark	Rnet	Pilot+	VR-2	PC	Hand	Brand
1001893	Shark Programming adaptor (DK-ADAPT)			X					X	Dynamic
00355.0440	Hand Held Programmer (DX-HHP-GDW)	X	X	X					X	Dynamic
1009567	Programming adaptor for DX2, Shark, A-series and R-series (DWIZ-ADAPT)	X	X	X*				X	X	Dynamic
00355.0469	Wizard programming cable (GSM61171)	X	X	X				X		Dynamic
1003236	Dynamic Wizard USB set (DWIZ-KIT + DWD-OEM-U)	X	X	X				X		Dynamic
9006857	R-net Diagnostic Test Tool (D50996)				X				X	PGDrivesTechnology
9006858	R-net Programming cable for R-net DTT (SA79174)				X				X	PGDrivesTechnology
PR0111	Pilot+ Hand Held Programmer PP1B (D49511)					X	X		X	PGDrivesTechnology
9006859	VR-2 Programming cable for R-net DTT (SA79176)						X		X	PGDrivesTechnology
PR0200	Pilot+ PC Programmer A (D50144)					X	X	X		PGDrivesTechnology
PR0210	PG Pilot+ PC Programmer B (D50145)					X	X	X		PGDrivesTechnology
9003295	R-net PC Programmer OEM (D50611)				X			X		PGDrivesTechnology
9003296	R-net PC programmer Dongle OEM				X			X		PGDrivesTechnology

X* = except the Hand Help Programmer

4 Spare parts

4.1 Use of the parts lists

This document is meant as a reference book to be used to order parts for the wheelchair that is shown on the front cover.

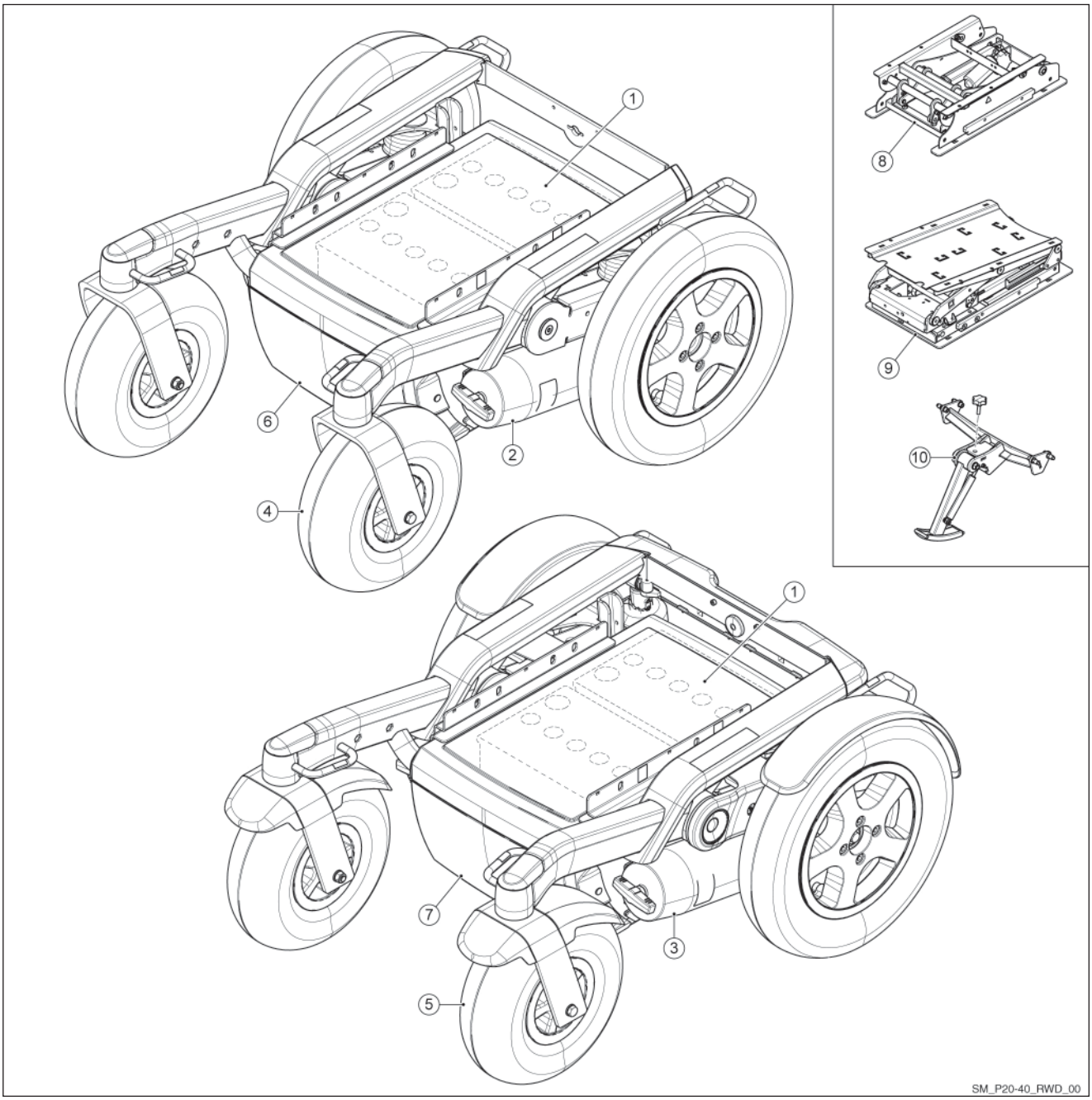
How to order:
When ordering parts, please specify:
- Serial number (see the identification plate)
- Group (to which the relevant part belongs)
- Article number
- Number of parts required
- Description (in the relevant language)
- Dimensions (if applicable)

Remark:
- If a part does not have a position number, it means that the part concerned cannot be purchased separately. The part concerned is part of the assembly shown. This assembly must be ordered as one piece. It has to be replaced in its entirety.
- Boxed position numbers refer to the relevant drawing.

Order address:
Please mail or fax your orders to your supplier.

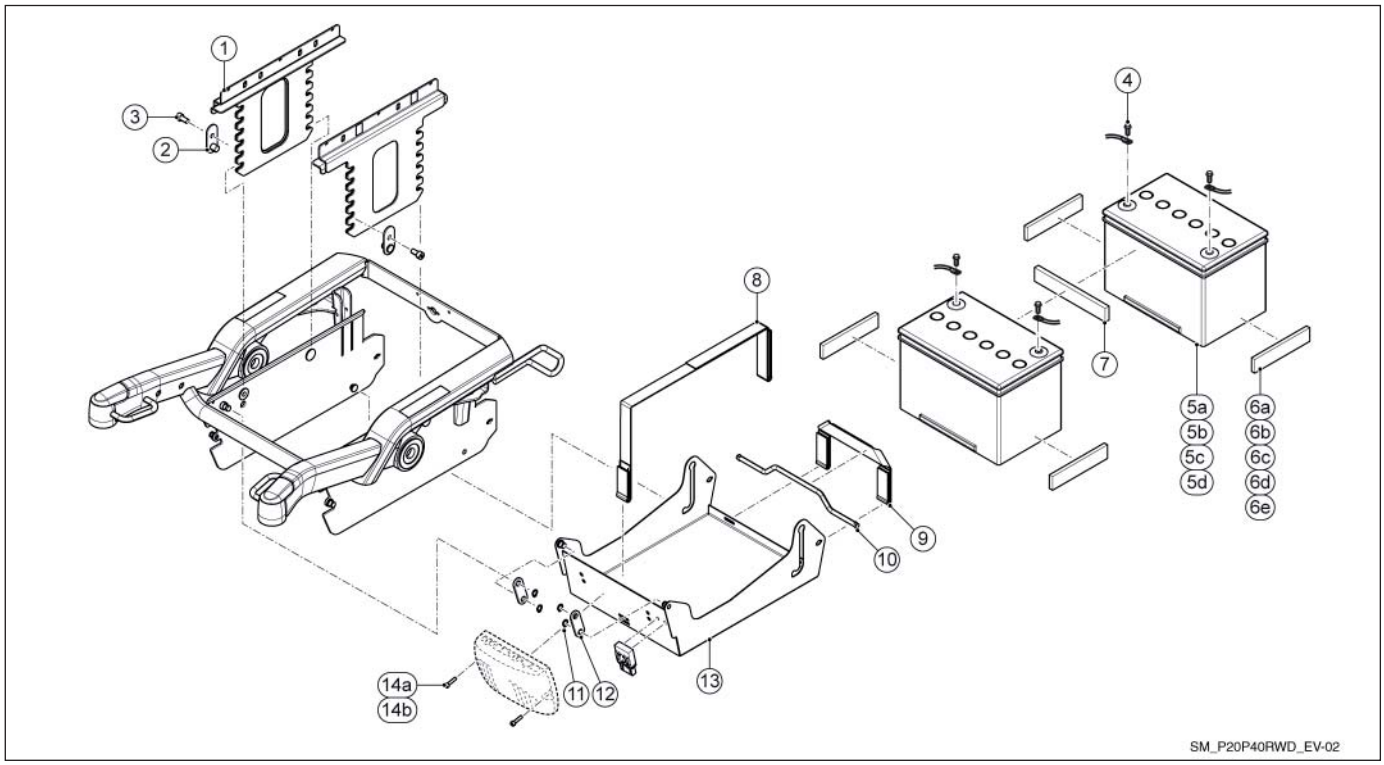
Service technicians:
Repairs may only be carried out by trained and authorised service technicians.
During the execution of their work they are at all times fully responsible for the fulfilment of locally applicable safety guidelines and standards.
Temporary employees and persons in training may only carry out repair and replacement work under the supervision of an authorised service technician.

4.2 Carrier and seat adjustments



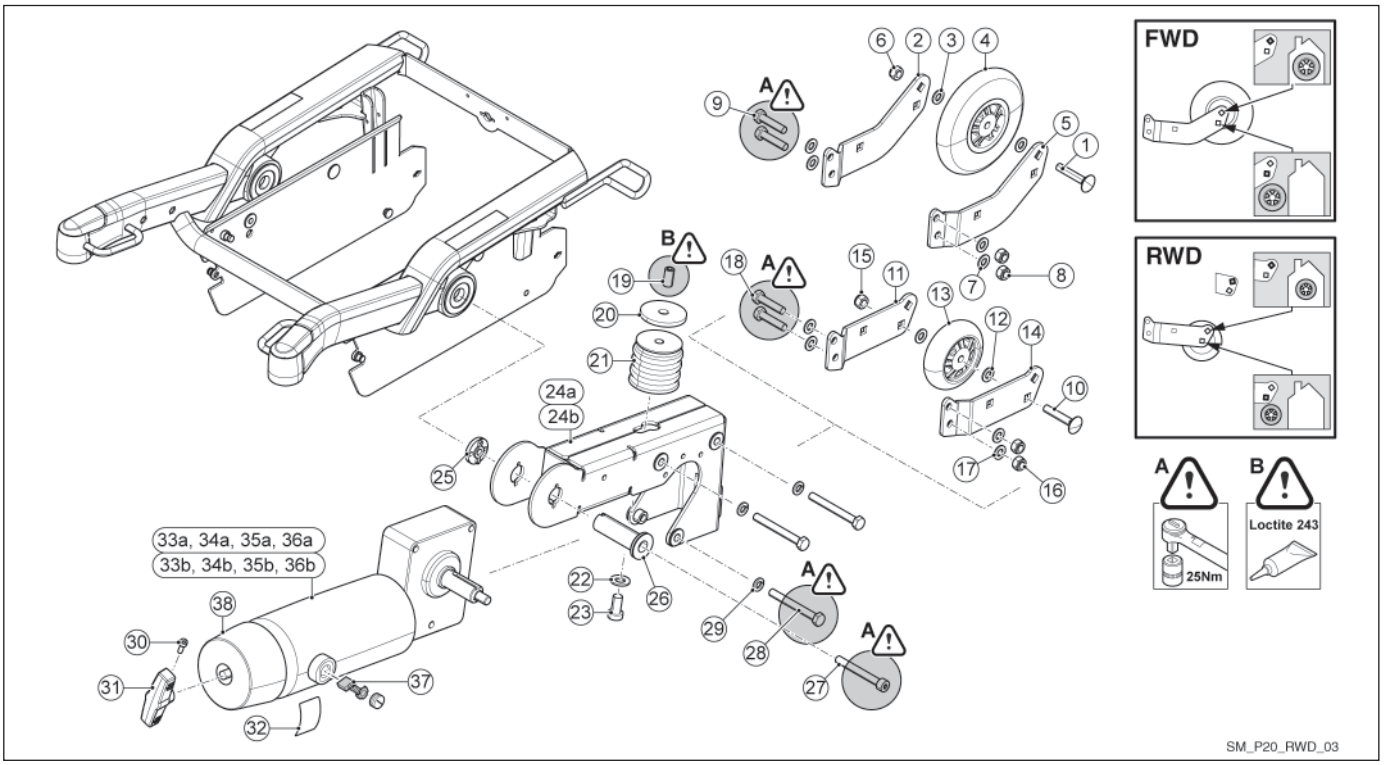
Pos	Description	Page
01	Battery tray and chair interface Puma 20/40	5
02	Suspension arm and motors Puma 20	6
03	Suspension arm and motors Puma 40	7
04	Castor forks and wheels Puma 20	8
05	Castor forks and wheels Puma 40	9
06	Covers Puma 20	10
07	Covers Puma 40	11
08	Tilt and lift modules Puma 20	12
09	Tilt and lift modules Puma 40	13
10	Kerb climber Puma 20/40	14

01 Carrier and seat adjustments / Battery tray and suspension and chair interface Puma 20/40



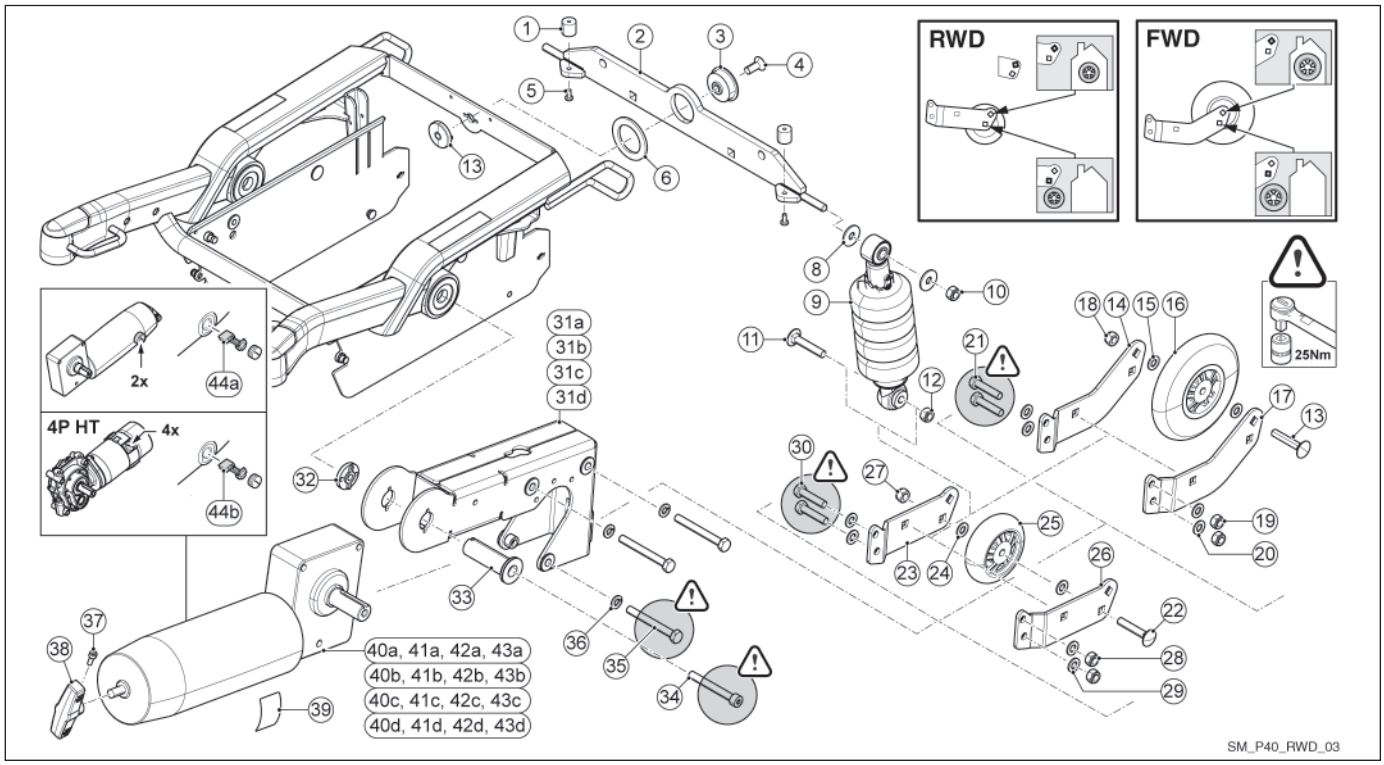
Pos	Qty	Article number	Description
1-3	1	9005935	Chair Interface set
4,5a	2	9002758	Battery MK M40-12 Gel (40Ah C20)
4,5b	2	9006051	Battery MK M50 AGM (50Ah C20)
4,5c	2	9002759	Battery MK M34-12 Gel (60Ah C20)
4,5d	2	1001453	Battery MK M24-12 Gel (74Ah C20)
6a,6b,6c,6d,7	4	9005956	Battery spacer set universal
6a,6b,7	4	9005957	Battery spacer set MK (40/50A)
6c,6d,7	4	9005958	Battery spacer set MK (60/74A)
6,7*	1	9005959	Battery spacer set Sonnenschein
			*= spacers needed if equiped with Sonnenschein Batteries (not a standard Handicare item)
8,9	1	9005931	Battery straps
8-13	1	9005930	Battery box
14a	2	1007080	Socket head screw DX2
14b	2	9006237	Socket head screw Shark
14c	2	00000.4042	Socket head screw R-net 120
14d	2	00000.4035	Socket head screw R-net 90 / VR2

02 Carrier and seat adjustments / Suspension arm and motors Puma 20



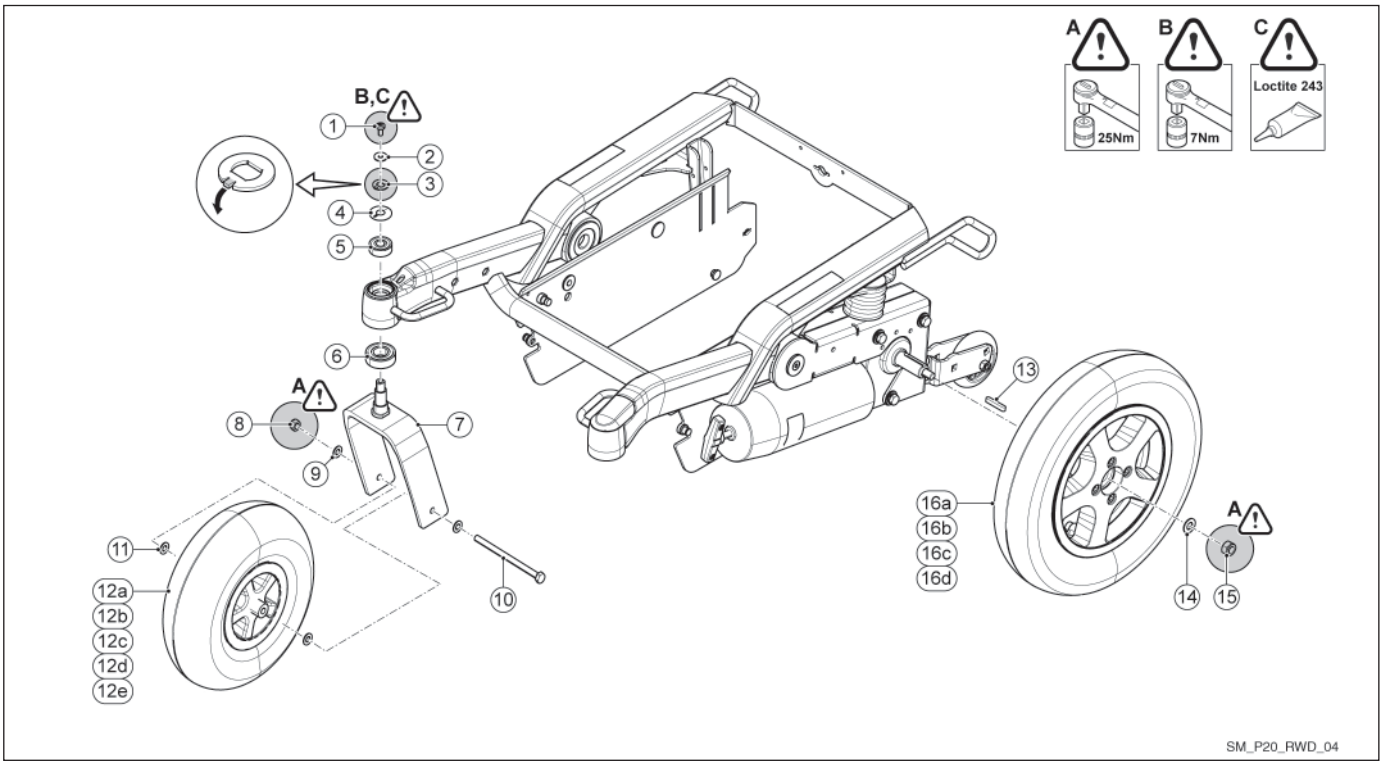
Pos	Qty	Article number	Description
1-9	2	9005963	Anti-Tip complete FWD
1,3,4,6	2	9002896	Anti tipper wiel FWD
10-18	2	9005962	Anti-Tip complete RWD
10,12,13,15	2	9002897	Anti tipper wiel RWD
19-23	1	9005964	Rubber suspension set
24a,25-29	1	9005939	Motor bracket right
24b-29	1	9005938	Motor bracket left
28-33a,37,38	1	9005940	Motor right 6 Km/h DX
28-32,33b,37,38	1	9005941	Motor left 6 Km/h DX
28-32,34a,37,38	1	9005942	Motor right 6 Km/h PG
28-32,34b,37,38	1	9005943	Motor left 6 Km/h PG
28-32,35a,37,38	1	9005944	Motor right 10 Km/h DX
28-32,35b,37,38	1	9005945	Motor left 10 Km/h DX
28-32,36a,37,38	1	9005946	Motor right 10 Km/h PG
28-32,36b,37,38	1	9005947	Motor left 10 Km/h PG
30-31	2	9005644	Freewheel lever
32	2	9002784	Brake Release Sticker
37	2	9006360	2 set Puma 20 Motor Brushes 4pc service
38	2	9006452	Puma 20 Motor Brake Cover service

03 Carrier and seat adjustments / Suspension arm and motors Puma 40



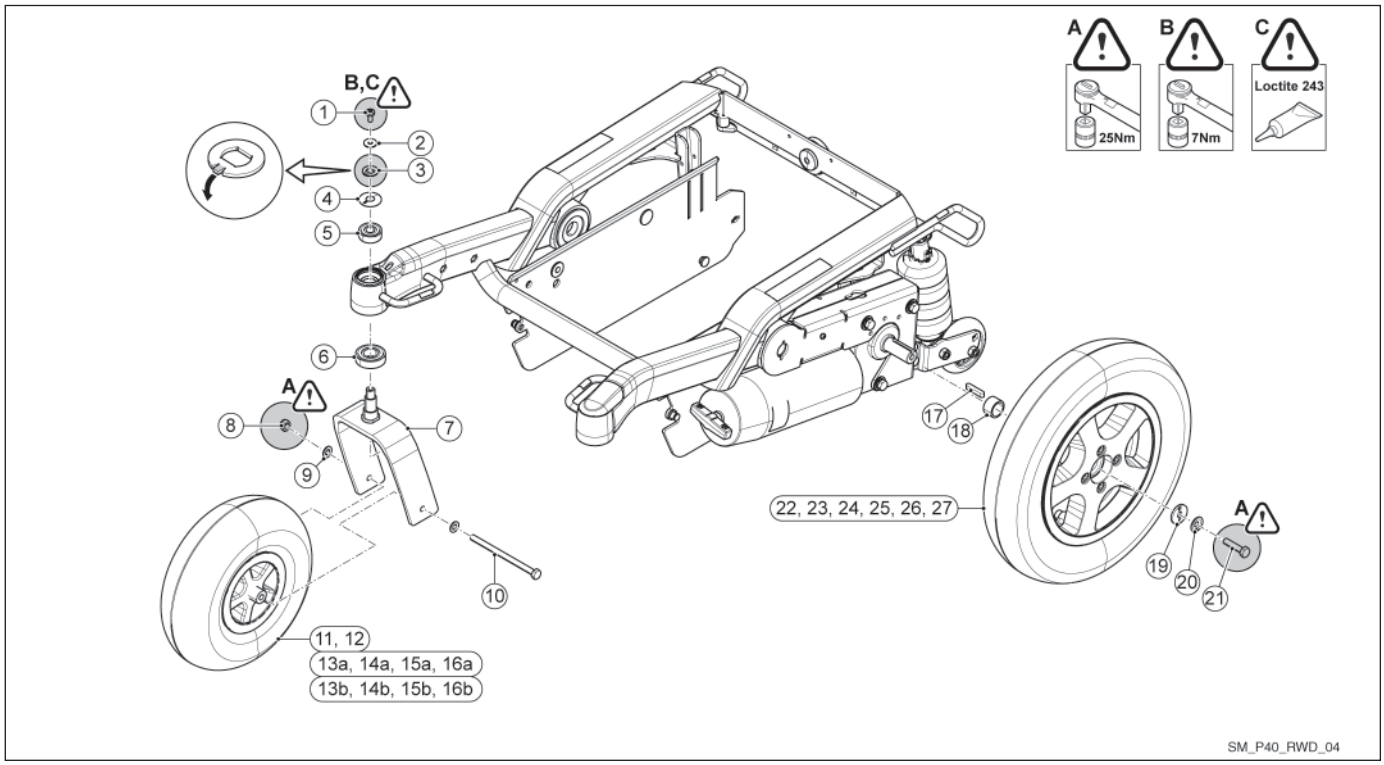
Pos	Qty	Article number	Description
1-12	1	9005965	Rubber suspension + bridge
8-12	1	9005966	Rubber suspension set
13-21	2	9005963	Anti-tip complete FWD
13,15,16,18	2	9002896	Anti tipper wiel FWD
22-30	2	9005962	Anti-tip complete RWD
22,24,25,27	2	9002897	Anti tipper wiel RWD
31a,32-36	1	9005939	Motor bracket right
31b-36	1	9005938	Motor bracket left
31c	1	9006782	Motor bracket 4 pole Alpine, right
31d	1	9006781	Motor bracket 4 pole Alpine, left
35-40a, 44a	1	9005949	Motor 6 Km/h DX, right
35-39,40b, 44a	1	9005948	Motor 6 Km/h DX, left
35-39, 40c, 44b	1	9006783	Motor 4-pole Alpine 6 Km/h DX, left
35-39, 40d, 44b	1	9006784	Motor 4-pole Alpine 6 Km/h DX, right
35-39,41a, 44a	1	9005951	Motor 6 Km/h PG, right
35-39,41b, 44a	1	9005950	Motor 6 Km/h PG, left
35-39, 41c, 44b	1	9006785	Motor 4-pole Alpine 6 km/h PG, left
35-39, 41d, 44b	1	9006786	Motor 4-pole Alpine 6 km/h PG, right
35-39,42a, 44a	1	9005952	Motor 10 Km/h DX, right
35-39,42b, 44a	1	9005953	Motor 10 Km/h DX, left
35-39, 42c, 44b	1	9006787	Motor 4-pole Alpine 10 km/h DX, left
35-39, 42d, 44b	1	9006788	Motor 4-pole Alpine 10 km/h DX, right
35-39,43a, 44a	1	9005954	Motor 10 Km/h PG, right
35-39,43b, 44a	1	9005955	Motor 10 Km/h PG, left
35-39, 43c, 44b	1	9006789	Motor 4-pole Alpine 10 km/h PG, left
35-39, 43d, 44b	1	9006790	Motor 4-pole Alpine 10 km/h PG, right
37-38	2	9005644	Freewheel lever
39	2	9002784	Brake Release Sticker
44a	2	9006361	2 set P40 motor brushes service
44b	2	9005107	4 set HT motor brushes service

04 Carrier and seat adjustments / Castor forks and wheels Puma 20



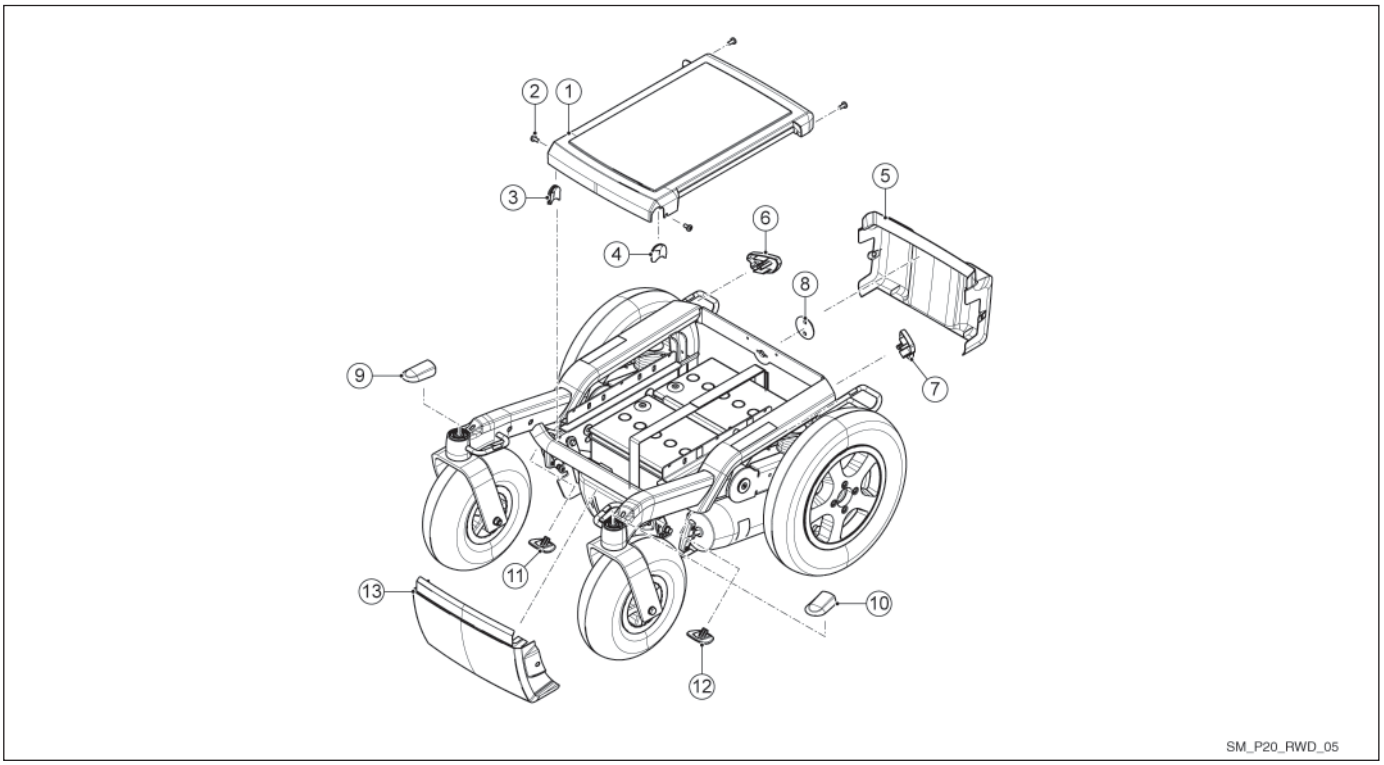
Pos	Qty	Article number	Description
1-6	2	9005934	Anti shimmy + bearings set
7-10	2	9005932	Castor fork
8-12a	2	9005986	Castor wheel indoor 2.80/2.50-4, air
8-11,12b	2	9005989	Castor wheel indoor 2.80/2.50-4, punctureproof
8-11,12c	2	9005987	Castor wheel outdoor right 3.00-4, grey air
8-11,12d	2	9006820	Castor wheel outdoor left 3.00-4, grey air
8-11,12e	2	9005990	Castor wheel outdoor 3.00-4, grey punctureproof
13, 14, 15, 16a	2	9005992	Drive wheel Indoor 12 1/2 x 2 1/4, air
13, 14, 15, 16b	2	9005995	Drive wheel Indoor 12 1/2 x 2 1/4, punctureproof
13, 14, 15, 16c	2	9005993	Drive wheel outdoor 3.00-8, grey air
13, 14, 15, 16d	2	9005996	Drive wheel outdoor 3.00-8, grey punctureproof

05 Carrier and seat adjustments / Castor forks and wheels Puma 40



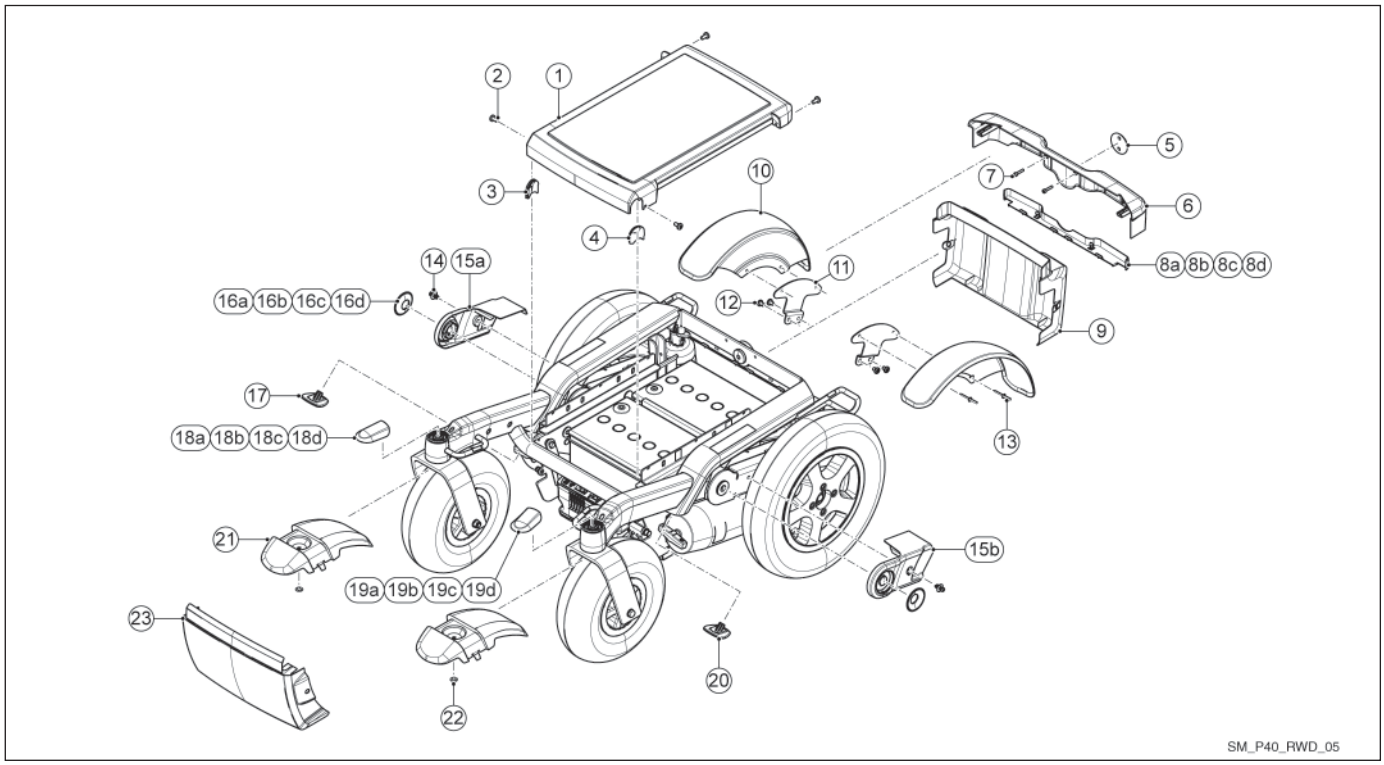
Pos	Qty	Article number	Description
1-6	2	9005934	Anti shimmy + bearings set
7-10	2	9005932	Castor fork
8-11	2	9005998	Castor wheel Indoor 2.80/2.50-4, air
8-10,12	2	9006003	Castor wheel indoor 2.80/2.50-4, punctureproof
8-10,13a	2	9006000	Castor wheel outdoor right 3.00-4, grey air
8-10,13b	2	9005999	Castor wheel outdoor left 3.00-4, grey air
8-10,14a	2	9006005	Castor wheel outdoor right 3.00-4, grey punctureproof
8-10,14b	2	9006004	Castor wheel outdoor left 3.00-4, grey punctureproof
8-10,15a	2	9006002	Castor wheel outdoor 3.00-4, right black air
8-10,15b	2	9006001	Castor wheel outdoor 3.00-4, left black air
8-10,16a	2	9006007	Castor wheel outdoor 3.00-4, right black punctureproof
8-10,16b	2	9006006	Castor wheel outdoor 3.00-4, left black punctureproof
17-22	2	9006009	Drive wheel indoor 12 1/2 x 2 1/4, air
17-21,23	2	9006012	Drive wheel indoor 12 1/2 x 2 1/4, punctureproof
17-21,24	2	9006010	Drive wheel outdoor 3.00-8, grey air
17-21,25	2	9006013	Drive wheel outdoor 3.00-8, grey punctureproof
17-21,26	2	9006011	Drive wheel outdoor 3.00-8, black air
17-21,27	2	9006014	Drive wheel outdoor 3.00-8, black punctureproof

06 Carrier and seat adjustments / Covers Puma 20



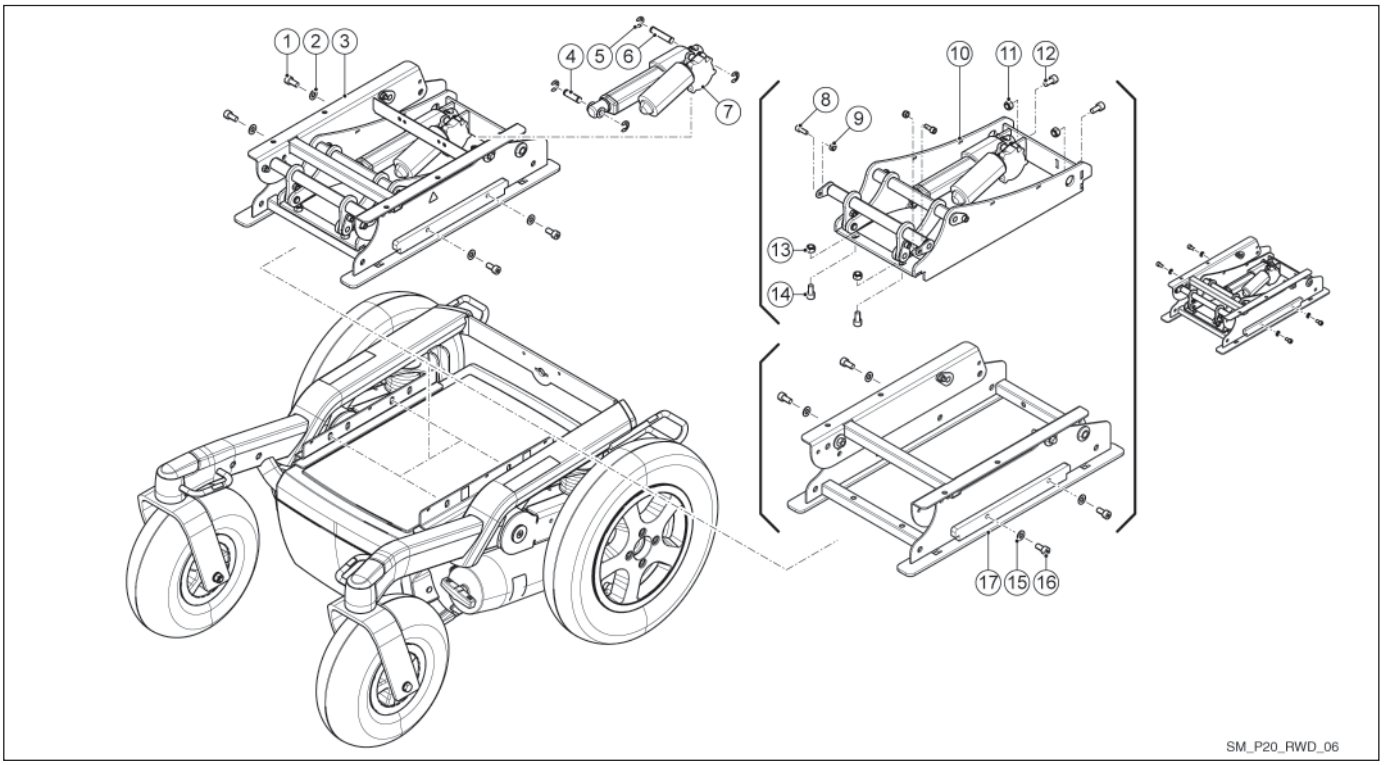
Pos	Qty	Article number	Description
1-4	1	9005971	Battery cover black
3-4	1	9005972	Battery cover clips set
5	1	9004517	Battery access cover
6-7	1	9005973	Tube end covers dark grey set
8	1	9005970	Handicare logo Service
9-10	1	9005981	Ballhead covers dark grey set
11-12	1	9005969	Tube bottom cover set
13	1	9004515	Power module cover

07 Carrier and seat adjustments / Covers Puma 40



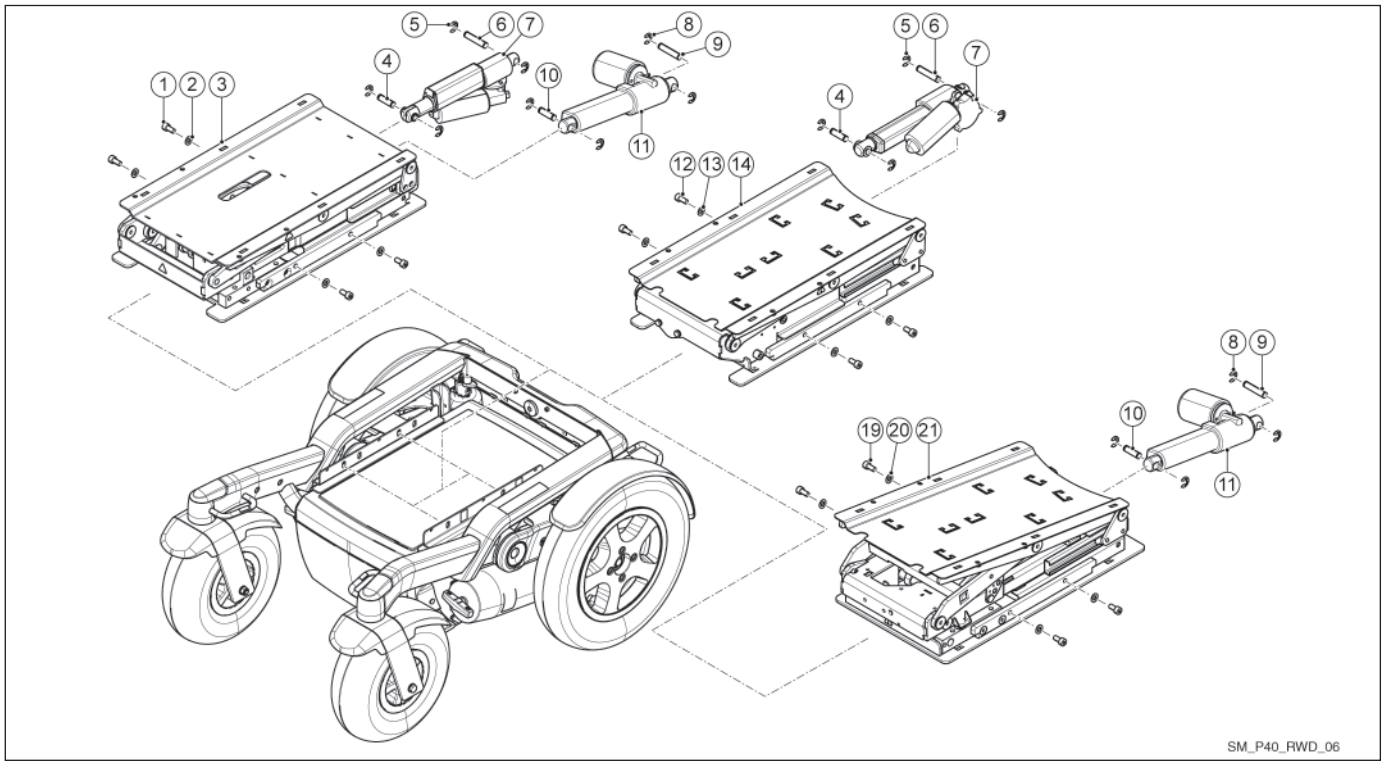
Pos	Qty	Article number	Description
1-4	1	9005971	Battery cover black
3-4	1	9005972	Battery cover clips set
5	1	9005970	Logo Handicare
6,7	1	9005974	Suspension bridge cover dark grey
8a,16a,18a,19a	1	9005982	Deco covers green
8b,16b,18b,19b	1	9005983	Deco covers blue
8c,16c,18c,19c	1	9005984	Deco covers orange
8d,16d,18d,19d	1	9005985	Deco covers silver
9	1	9004517	Battery access cover
10,13	2	9005978	Drive wheel fender black with bracket
14,15a,15b	1	9005975	Motor arm covers dark grey set
17,20	1	9005969	Tube bottom cover set
21-22	2	9005976	Castor wheel fender black
23	1	9004515	Power module cover

08 Carrier and seat adjustments / Tilt modules Puma 20



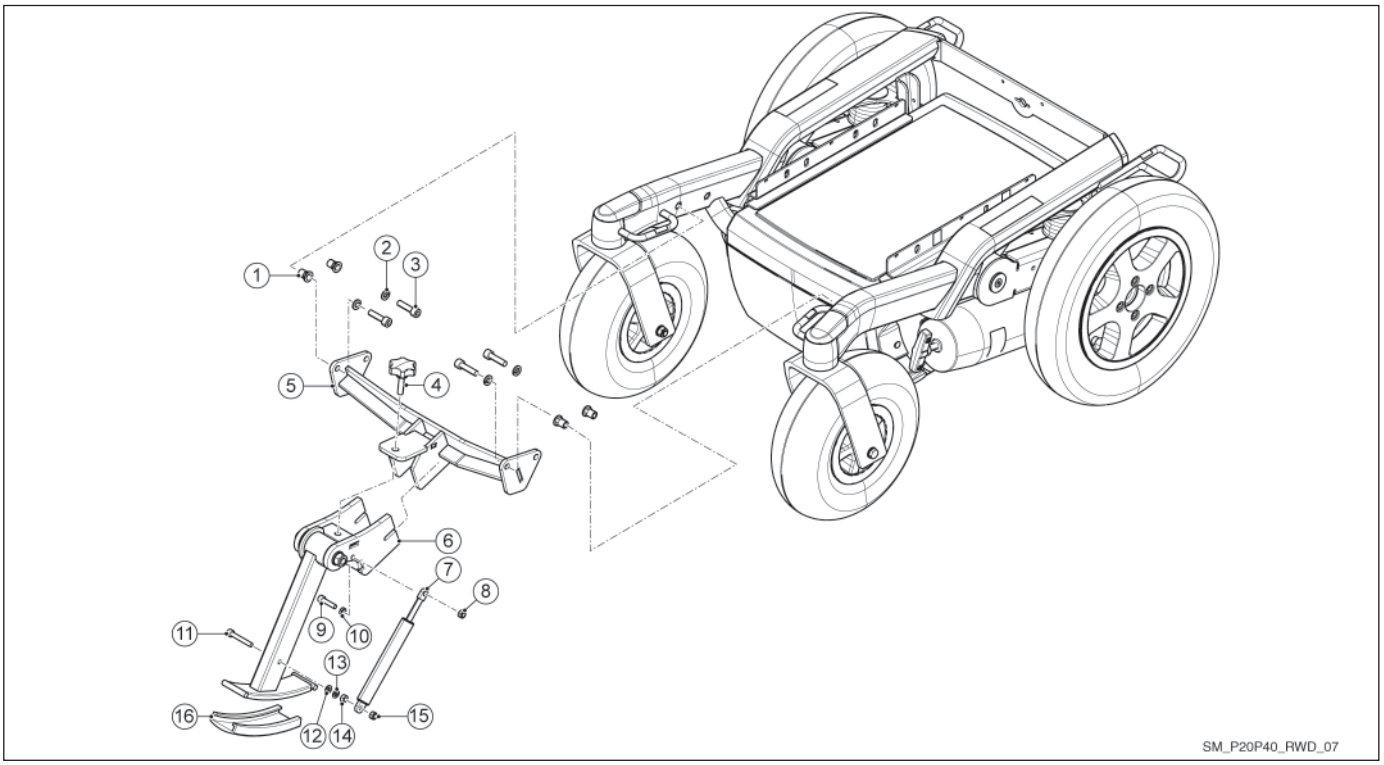
Pos	Qty	Article number	Description
1-7	1	9006017	Electrical tilt 25º
4-6	1	9006025	Til actuator mounting set
4-7	1	9006199	Tilt actuator
8-14	1	9006018	Electrical tilt 25º Add-on
15-17	1	9006016	Mechanical tilt

09 Carrier and seat adjustments / Tilt and lift modules Puma 40



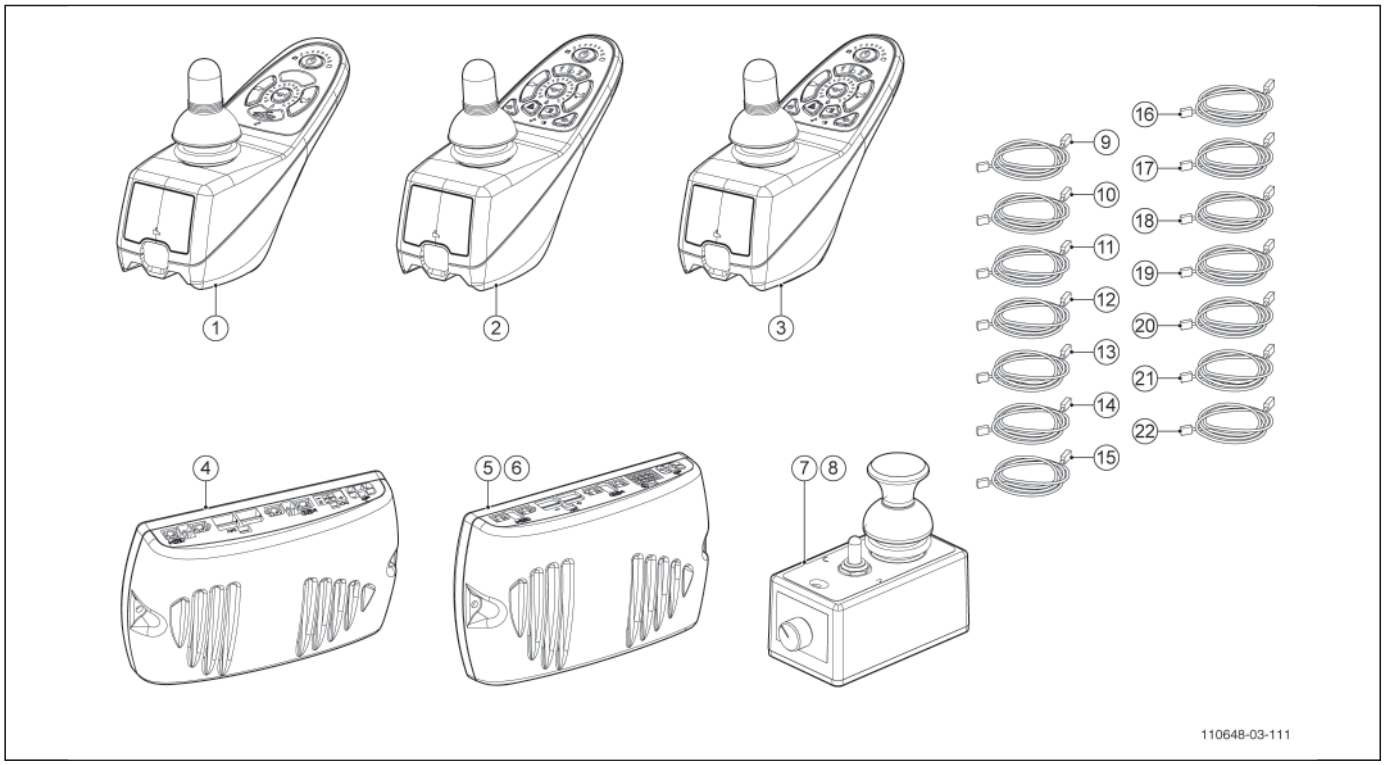
Pos	Qty	Article number	Description
1-3, 4-7, 8-11	1	9006020	Electrical lift with electrical tilt 45º
4-6	1	9006025	Til actuator mounting set
4-7	1	9006023	Tilt actuator
8-10	1	9006024	Lift actuator mounting set
8-11	1	9006022	Lift actuator
12-18, 4-7	1	9006019	Electrical lift with fixed tilt
19-25, 8-11	1	9006021	Electrical tilt 45º

10 Carrier and seat adjustments / Kerb climber Puma 20/40



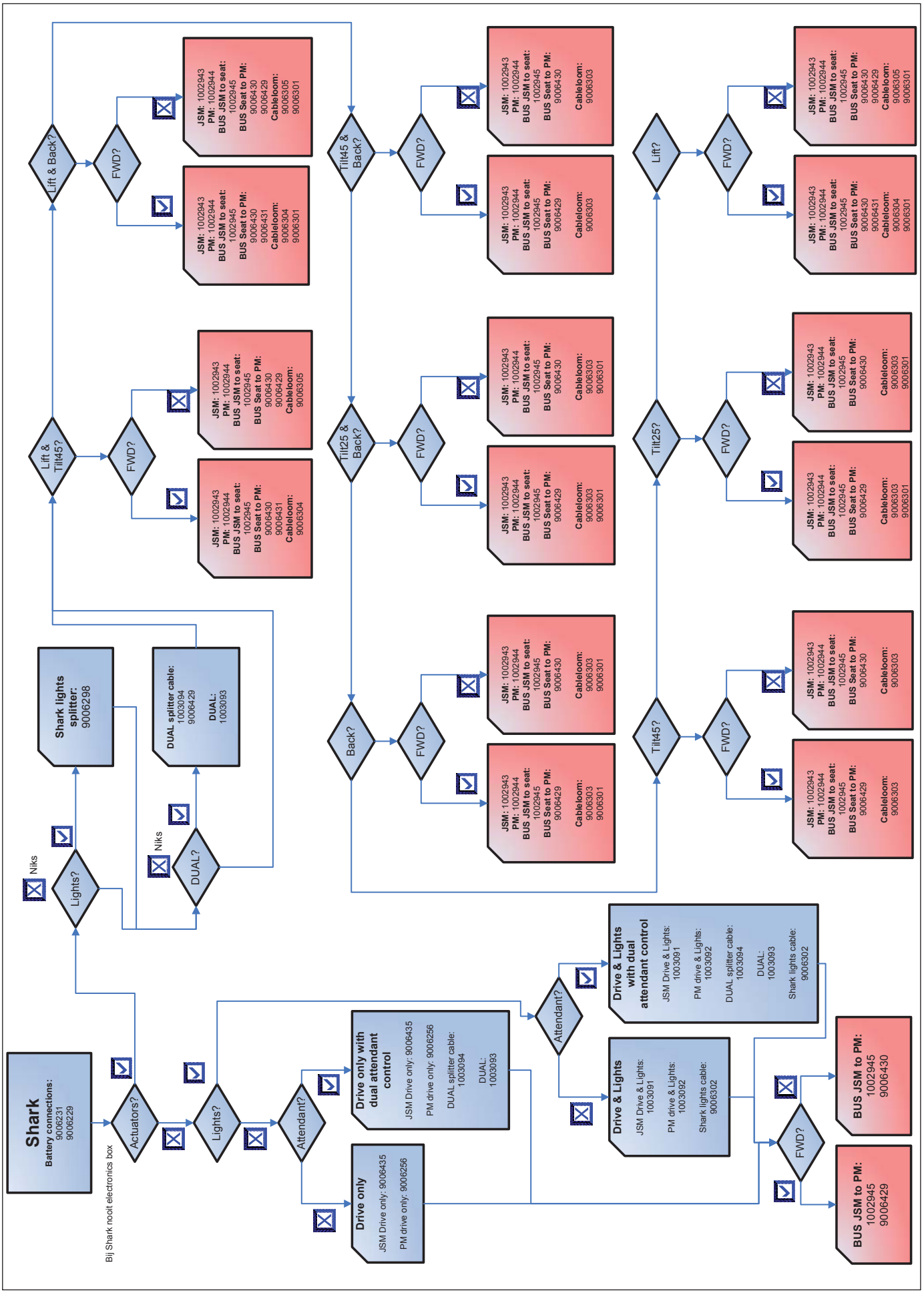
Pos	Qty	Article number	Description
1-16	1	9005740	Kerb climber
7-15	1	9003571	Kerb climber gas spring
16	1	9003520	Kerb climber shoe

4.3 Wiring and modules Shark

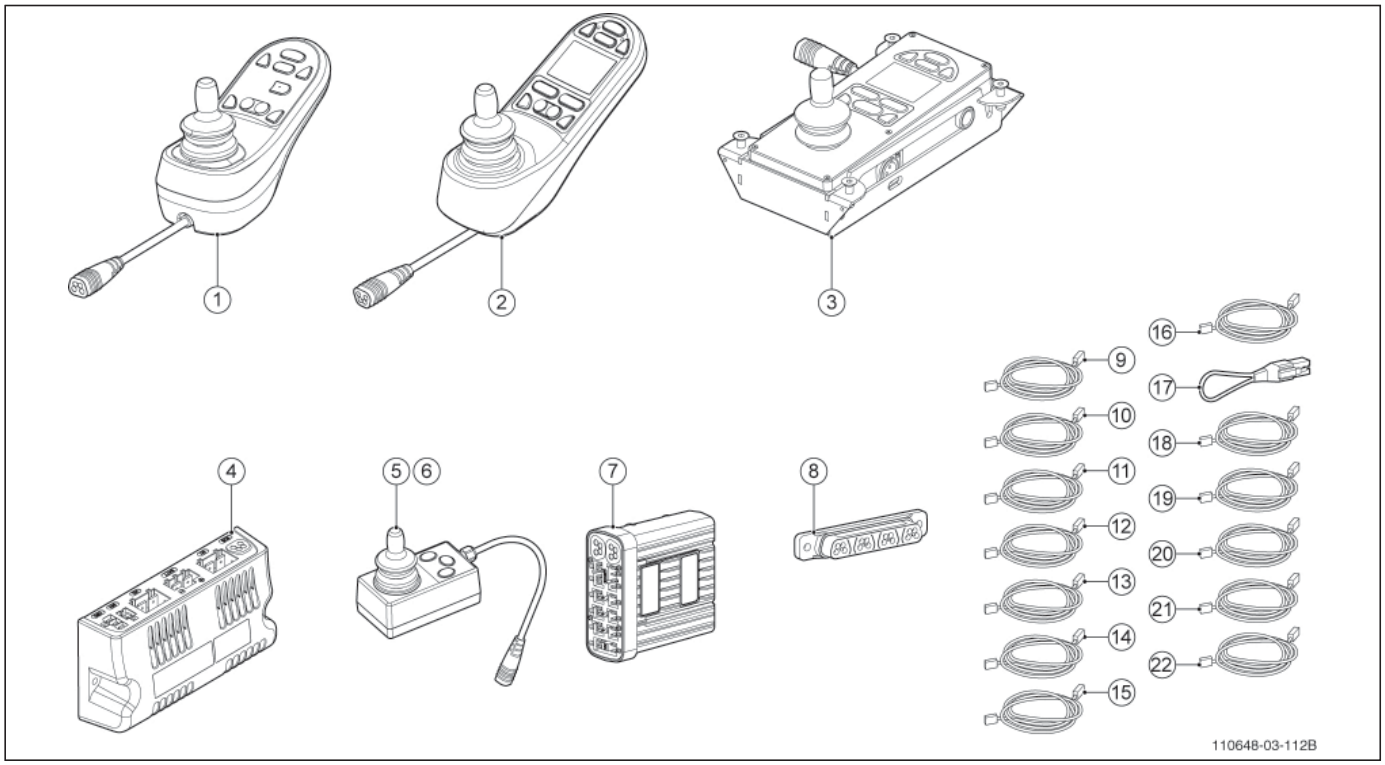


Pos	Qty	Article number	Description
1	1	9007143	Shark Remote Drive Only DK-REMD01 service
2	1	9007144	Shark Remote Drive+Lights DK-REMD31 service
3	1	9007145	Shark Remote Drive+Lights+2Act. DK-REMD21 service
4	1	9007150	Shark Power Module DK-PMB01 (60 + 15A) service
5	1	9007151	Shark Power Module DK-PMB31 (60+15A) service
6	1	9007152	Shark Power Module DK-PMB21 (60+15A) service
7	1	9006027	Shark Attendant Remote DK-ACU service
8	1	9006030	Shark Attendant Remote DK-ACU +bracket service
9	1	1002945	Shark bus cable 1.5m
10	1	1003094	Shark ACU connection cable 1.5m
11	1	9006429	Shark bus extension cable 0.9m
12	1	9006430	Shark bus extension cable 1.2m
13	1	9006431	Shark bus extension cable 0.64m
14	1	9006432	Shark bus cable 1.0m
15	1	9006298	P2040 Shark Cable Light (for +Act)
16	1	9006301	P2040 Cable Inhibit Loop
17	1	9006302	P2040 Shark Cable Light (for No Act)
18	1	9006303	P2040 Shark Cable Light+Tilt+Back
19	1	9006304	P2040 Shark Cable Light+Lift+Act FWD
20	1	9006305	P2040 Shark Cable Light+Lift+Act RWD
21	1	9006229	Fuse Cable 70A
22	1	9006231	Dynamic Battery Cable

Chart Shark system; to determine the correct system parts

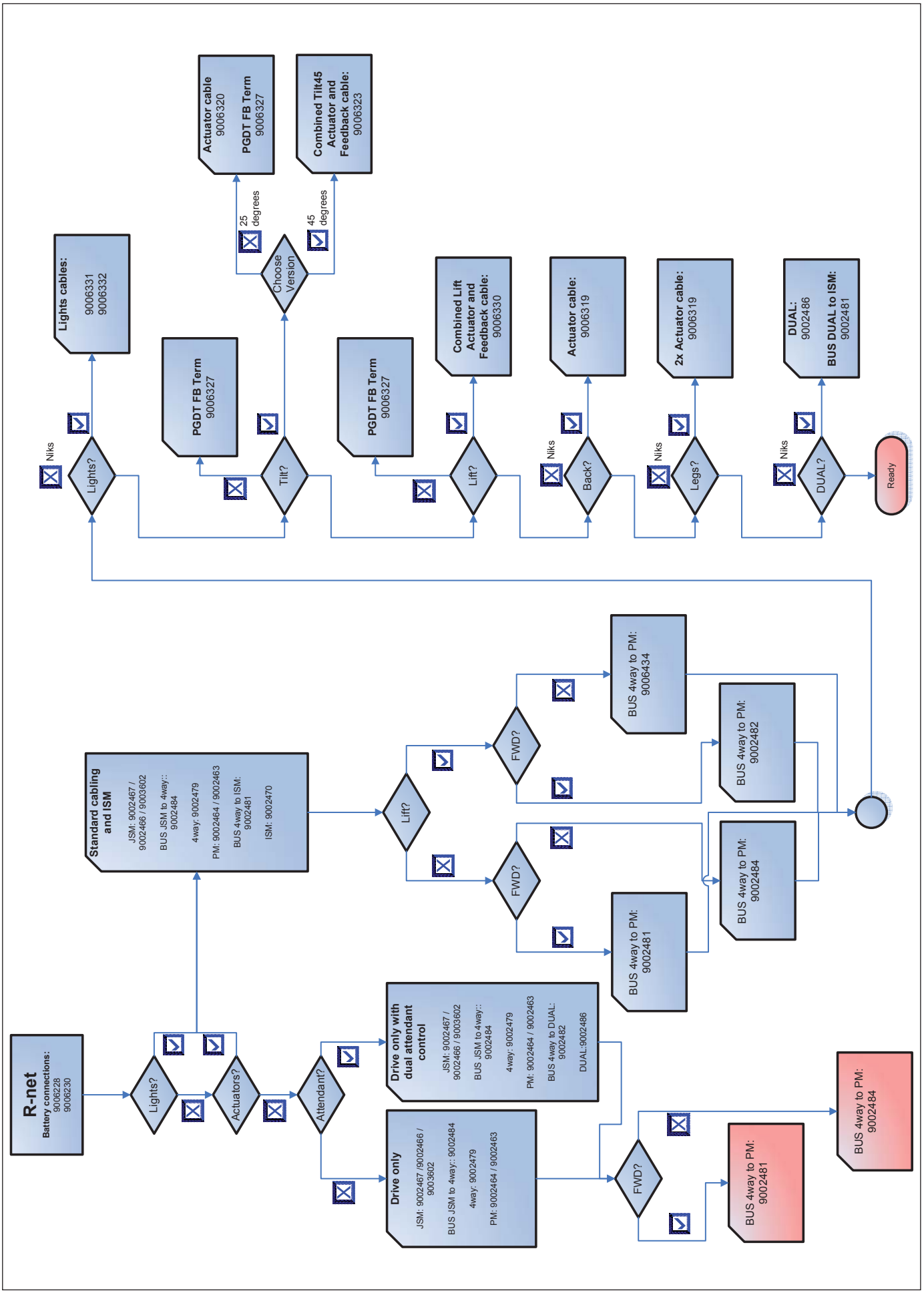


4.4 Wiring and modules R-net

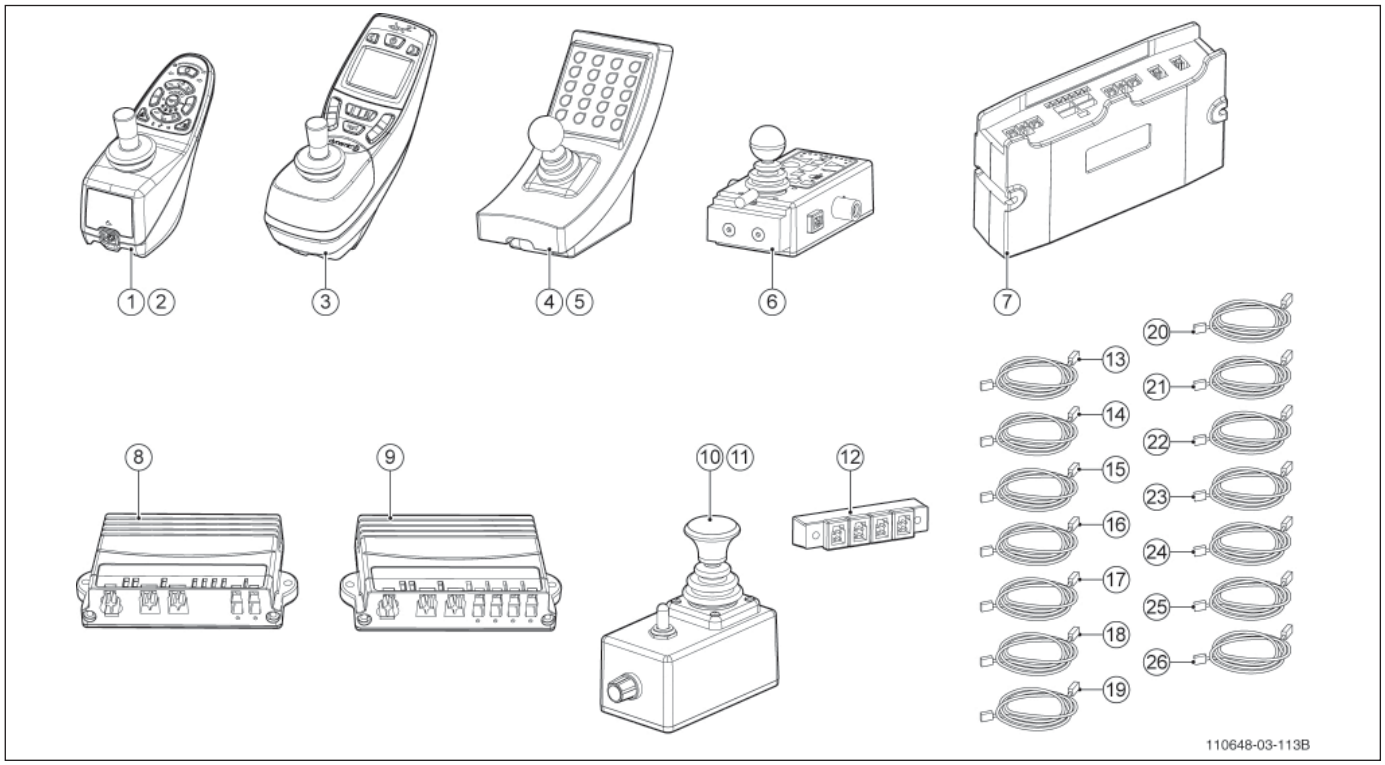


Pos	Qty	Article number	Description
1	1	9007156	R-net Joystick Module Lights JSM LED-L service
2	1	9002910	R-net Joystick Module Colour CJSM-L-sw service
3	1	9007165	R-net Joystick Module Colour CJSM-L-sw Worktop service
4	1	9002918	R-net Power Module PM120 (120A) service
5	1	9006030	R-net Dual Attendant Module service
6	1	9006034	R-net Dual Attendant Module + bracket service
7	1	9002912	R-net Seating/Lighting Module ISM-6L (6Act+Lights) service
8	1	9006238	R-net 4-way Connector Block service
9	1	9006434	R-net Cable 2.5m
10	1	9002481	R-net Cable 1.0m
11	1	9002482	R-net Cable 2.0m
12	1	9002484	R-net Cable 1.5m
13	1	9002579	R-net Cable 0.5m
14	1	9006319	P2040 PGDT Cable Act 500mm
15	1	9006320	P2040 PGDT Cable Act 1050mm
16	1	9006323	P2040 PGDT Cable Tilt45 950mm
17	1	9006327	P2040 PGDT Cable Inhibit Loop
18	1	9006330	P2040 PGDT Cable Lift 1520mm
19	2	9006331	P2040 R-net Cable Light
20	1	9006332	P2040 R-net Cable Light+Horn
21	1	9006228	PGDT Battery Cable
22	1	9006230	Fuse Cable 100A

Chart R-net system; to determine the correct system parts

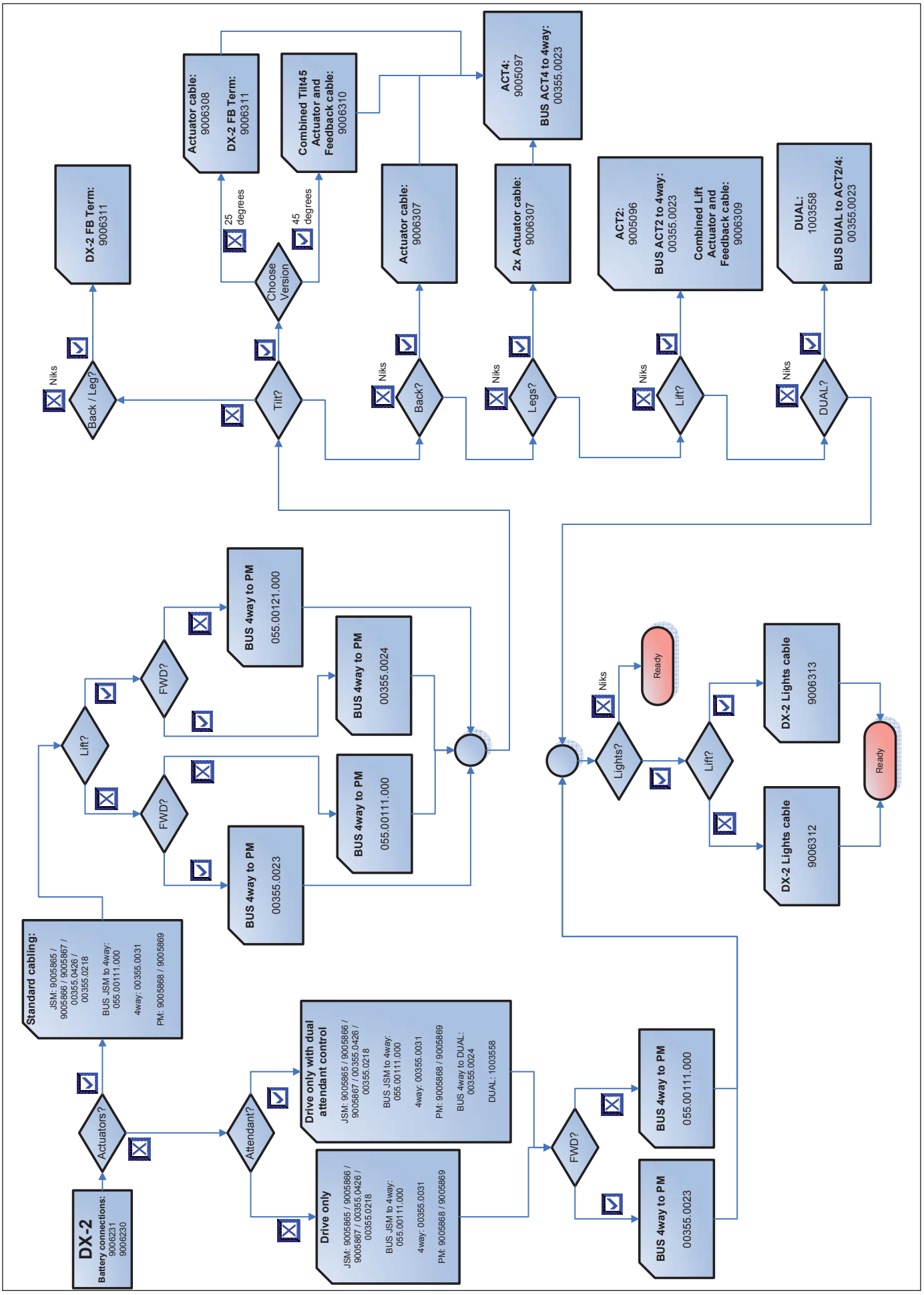


4.5 Wiring and modules DX2

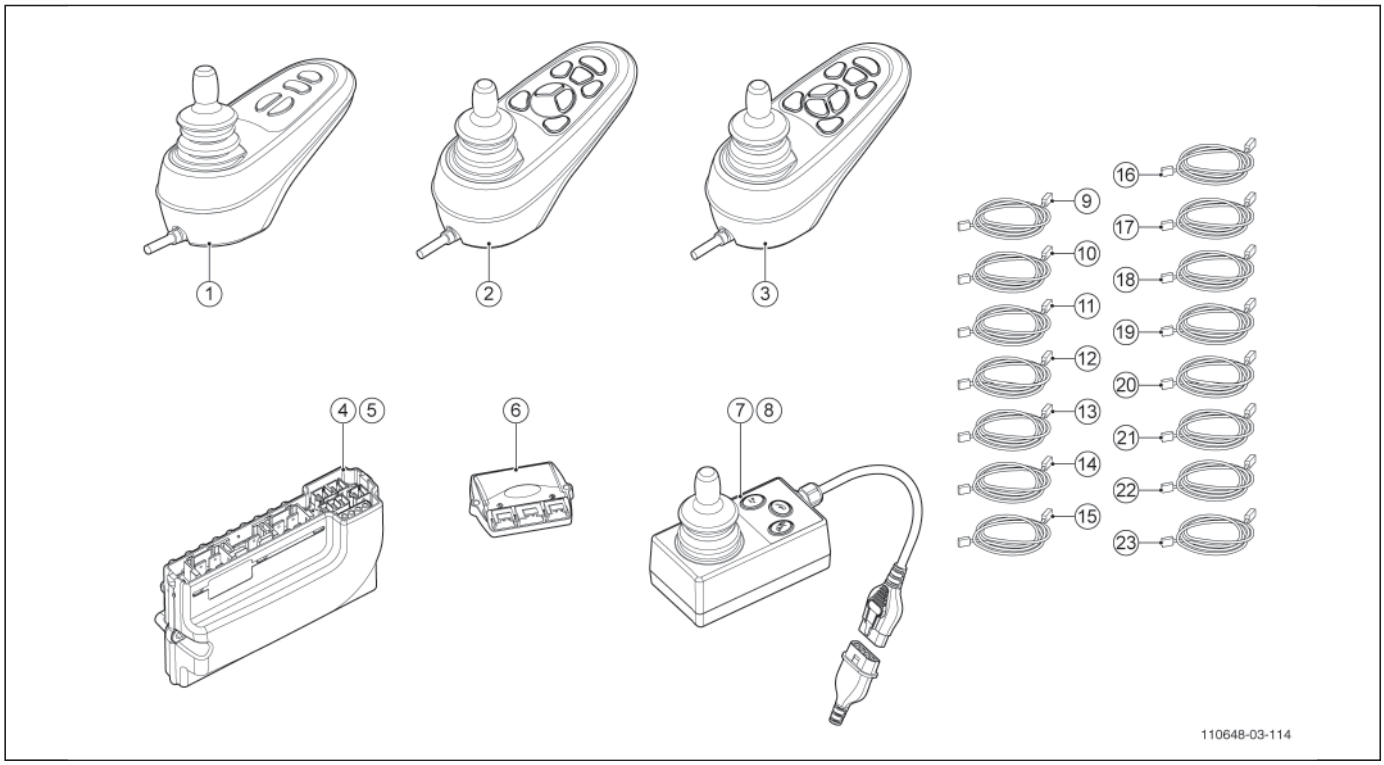


Pos	Qty	Article number	Description
1	1	9007146	DX2 Remote REM420 service
2	1	9007147	DX2 Remote REM421 service
3	1	9007148	DX2 Remote REM550 service
4	1	9007154	DX 16 key Remote Lights REM48 service
5	1	9007155	DX 16 key Remote PLUS REM48 service
6	1	9007167	DX-12 key Remote Worktop REM41 service
7	1	9007159	DX2 Power Module PMA90L (90A+Lights) service
8	1	9007162	DX2 Actuator Module 2channel ACT2 service
9	1	9007163	DX2 Actuator Module 4channel ACT4 service
10	1	9006028	DX(2) Attendant Remote ACU3 service
11	1	9006032	DX(2) Attendant Remote ACU3 +bracket service
12	1	9006239	DX(2) BUS 4 Way Socket (DX-SKT-X4) service
13	1	00355.0023	DX(2) bus cable 1.0 m.
14	1	00355.0024	DX(2) bus cable 2.0 m.
15	1	055.00111.000	DX(2) bus cable 1.5 m.
16	1	055.00121.000	DX(2) bus cable 2.5 m.
17	1	9006307	P2040 DX(2) Cable Act 500mm
18	1	9006308	P2040 DX(2) Cable Act 1050mm
19	1	9006309	P2040 DX(2) Cable Lift 1520mm
20	21	9006310	P2040 DX(2) Cable Tilt45 950mm
21	1	9006311	P2040 DX(2) Cable Inhibit Loop
22	1	9006312	P2040 DX(2) Cable Light 1300mm
23	1	9006313	P2040 DX(2) Cable Light 1800mm
24	1	9006230	Fuse Cable 100A
25	1	9006231	Dynamic Battery Cable
26	1	9006250	Ferrite Clamp WE 742 712 22

Chart DX2 system; to determine the correct system parts

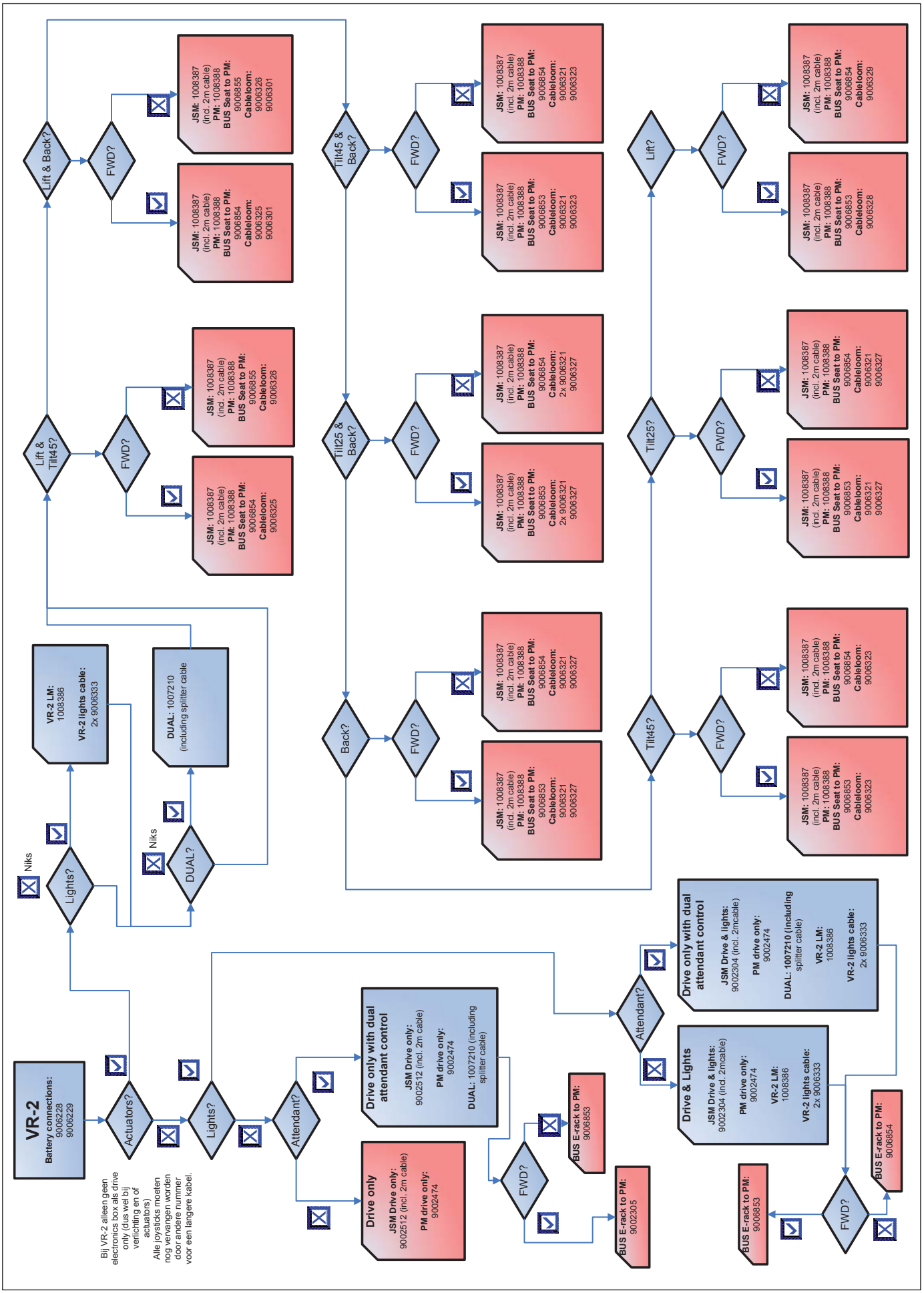


4.6 Wiring and modules VR-2



Pos	Qty	Article number	Description
1	1	9002907	VR-2 Joystick Module Drive Only JSM service
2	1	9002908	VR-2 Joystick Module Lights JSM-L service
3	1	9002909	VR-2 Joystick Module Act & Lights JSM-A-L service
4	1	9002916	VR-2 Power Module VR2-90 (90A) service
5	1	9002917	VR-2 Power Module +2Act VR2-90-2A (90A) service
6	1	9002911	VR-2 Lighting Module service
7	1	9006029	VR-2 Dual Attendant Module service
8	1	9006033	VR-2 Dual Attendant Module + bracket service
9	1	9002305	VR-2 Extension Cable 0.5m
10	1	9006853	VR-2 Extension Cable 1m
11	1	9006854	VR-2 Extension Cable 1,5m
12	1	9006855	VR-2 Extension Cable 2m
13	1	9006301	P2040 Cable Inhibit Loop
14	1	9006321	P2040 PGDT Cable Act 1350mm
15	1	9006323	P2040 PGDT Cable Tilt45 950mm
16	1	9006325	P2040 VR-2 Cable Lift+Act FWD
17	1	9006326	P2040 VR-2 Cable Lift+Act RWD
18	1	9006327	P2040 PGDT Cable Inhibit Loop
19	1	9006328	P2040 PGDT Cable Lift 900mm
20	1	9006329	P2040 PGDT Cable Lift 1100mm
21	1	9006333	P2040 VR-2 Cable Lights
22	1	9006228	PGDT Battery Cable
23	1	9006229	Fuse Cable 70A

Chart VR-2 system; to determine the correct system parts



5 Service instructions

5.1 Maintenance plan

Below, we have indicated what needs to be checked, how often this should be done and by whom.

Time	Description	To be carried out by	
		User	Supplier
Daily	• Charging the batteries, after each use.	x	-
Weekly	• Checking the tyre pressures.	x	-
Monthly	• Cleaning the wheelchair.	x	-
	• Cleaning the upholstery (if necessary).	x	-
Annually	• Inspecting the electrical system.	-	x
	• Checking the batteries.	-	x
	• Inspecting the drive.	-	x
	• Inspecting the mechanical parts.	-	x
	• Inspecting the bearings.	-	x
	• Inspecting the suspension.	-	x
	• Checking the tyres.	-	x
	• Checking all fastenings and bolts: tighten if necessary	-	x

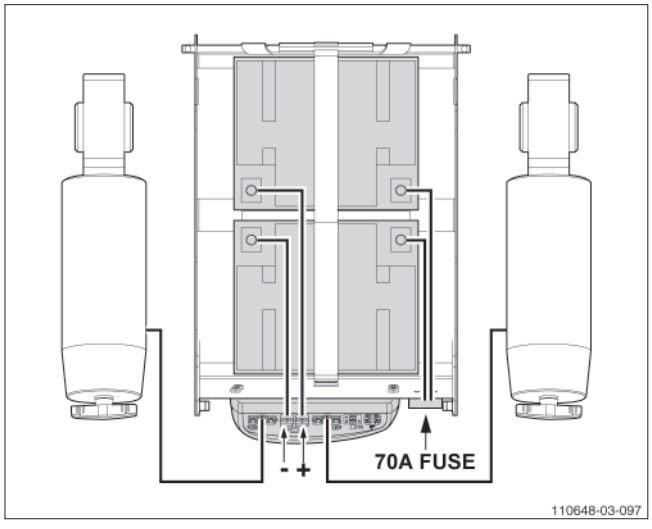
This document is a reference book to be used to order parts for the wheelchair model shown on the front cover.

Batteries
For maintenance, see the following documentation:
- Battery instructions.
- Battery charger user manual.

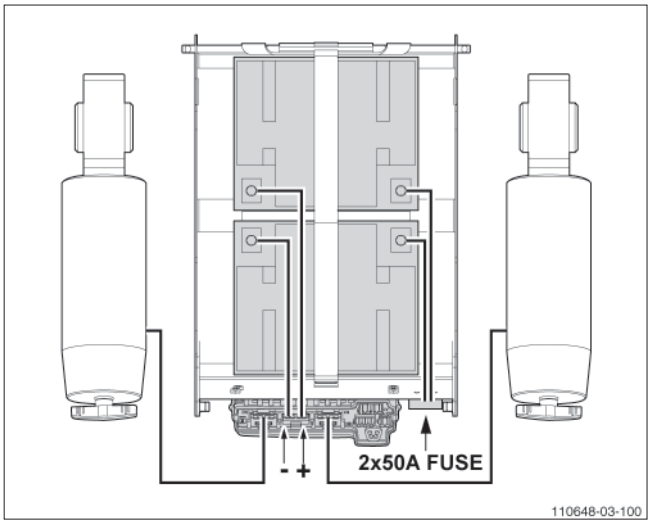
The wheelchair uses dry gel batteries. These dry batteries (dry fit) are sealed and are maintenance free.
The battery wiring diagram is located on a sticker inside the battery tray.

Shark Diagrams / R-net Diagram / DX2 Diagram / VR-2 Diagram

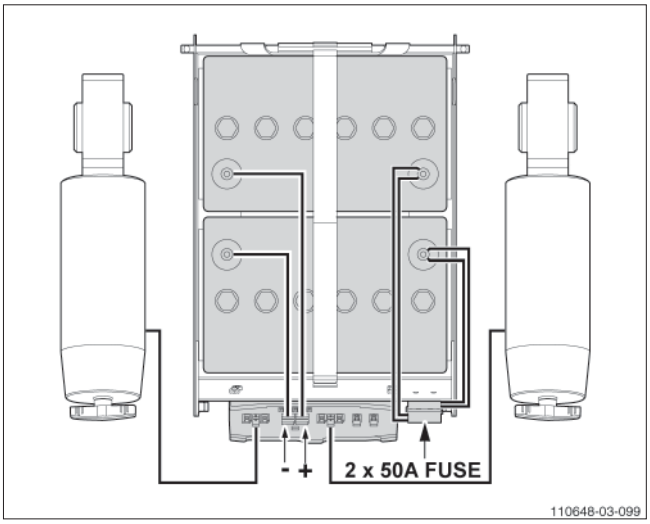
Shark



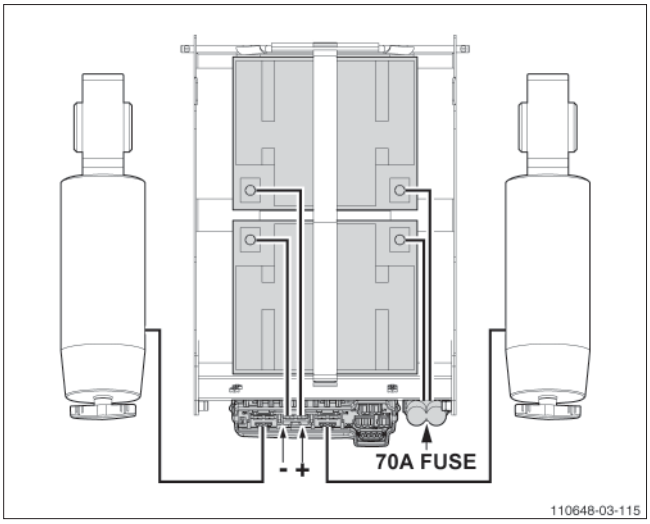
R-net



DX2



VR-2



⚠
- Make sure that the batteries are always well charged.
- Do not use the wheelchair if the batteries are almost flat. This may damage the batteries and you run the risk of an unintended standstill.
- The use of ‘wet’ batteries is not permitted. If the batteries have to be replaced, use only dry batteries.

5.2 Assembly, replacement and adjustment instructions

This chapter covers illustrated assembly, replacement and adjustment instructions.

Every separate visual instruction is prefaced with:
- Preparation instructions
- Relevant article numbers
- Tools used
- Info (suggestions and advice to help you carry out tasks or procedures more easily)
- Notices (extra notes covering information you need when executing the specific task)

In the visual instructions illustrate the tools needed for the specific task.

5.2.1 Puma 20 / Puma 40 Carrier

Converting Puma 20/40 front wheel drive (FWD) to rear wheel drive (RWD) and vice versa.

Preparation
- Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in ‘drive’ mode. If the freewheel switch is in ‘push’ mode this will make loosening the bolts impossible.
- Remove the leg rests.
- Remove the entire seating unit (incl. electrical lift, electrical tilt or mechanical tilt) from the carrier. Two people are needed to carry out this operation.

Instructions
Note! Suitable work area required!
The following operations are required to convert the Puma 20/40:
- Change the direction of drive wheels and the mudguards (only Puma 40).
- Replace the anti-tip wheels and the anti-tip brackets (RWD wheels and brackets into FWD wheels and brackets).
- Remount the interface and seating.
- Reprogram the wheel chair.

Note! The visual instructions show all actions only on one side. Carry out all actions also on the other side of the carrier!

Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.
- Some parts need to be replaced; the replacement is indicated by symbol.
- Some operations have to be carried out by two persons; this is indicated by a symbol.

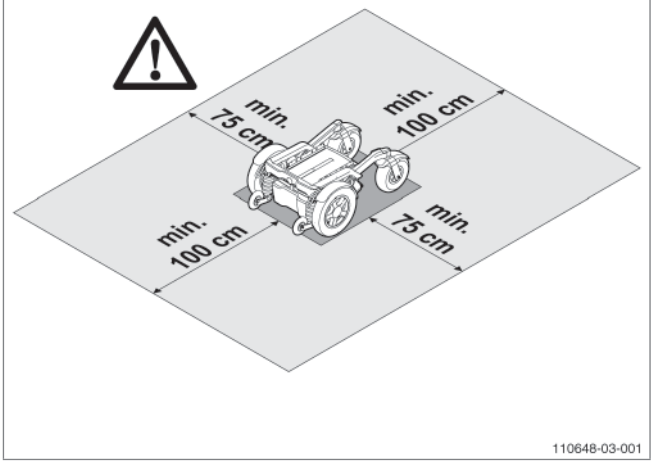
Relevant article numbers
- 9005962 P2040 Anti-Tip RWD Complete Service
- 9005963 P2040 Anti-Tip FWD Complete Service
- For more information see the eletrical diagrams at § 7.3.

Tools used
- Lifting device
- Allen key, 6 mm
- Open ended or ring spanners, 13 mm, 2x
- Torx key T30
- Screwdriver, medium, 5 mm
- Hammer (plastic)
- Chaser
- Torque wrench, socket, 13 mm
- Pair of wire-cutters
- Water pump pliers
- Tie wraps

Icons
- Dispose of waste parts in accordance with local regulations.
- Action must be carried out by two persons!
- Bolts are provided with Loctite thread locker!
- **Note!** Be aware of the issue!

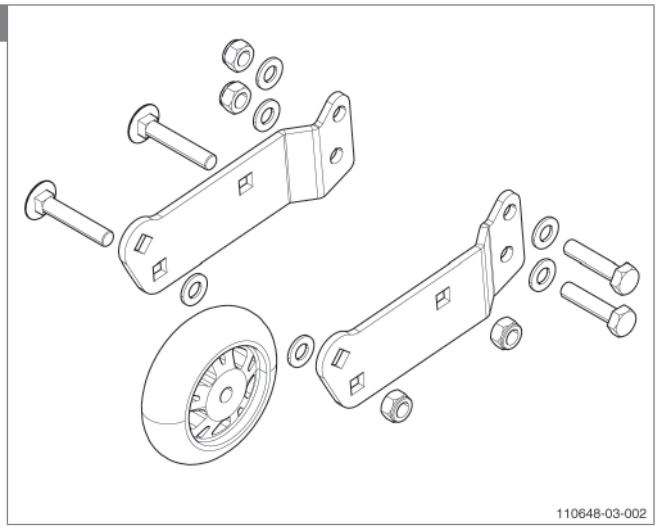
Step 1 Preparation.

1



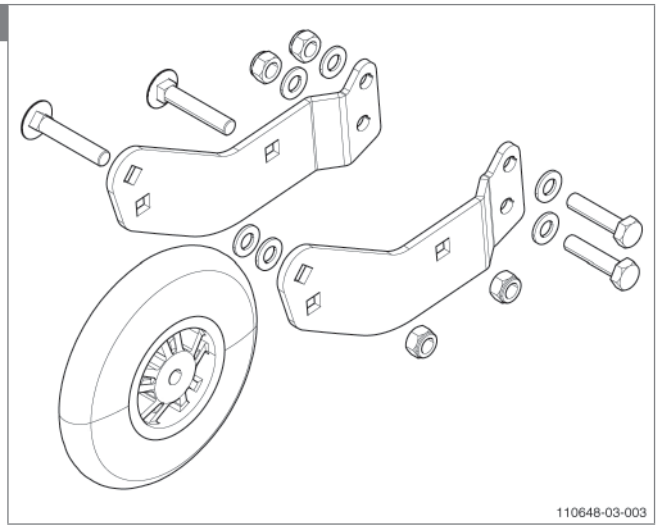
Note! Suitable work area required!

2



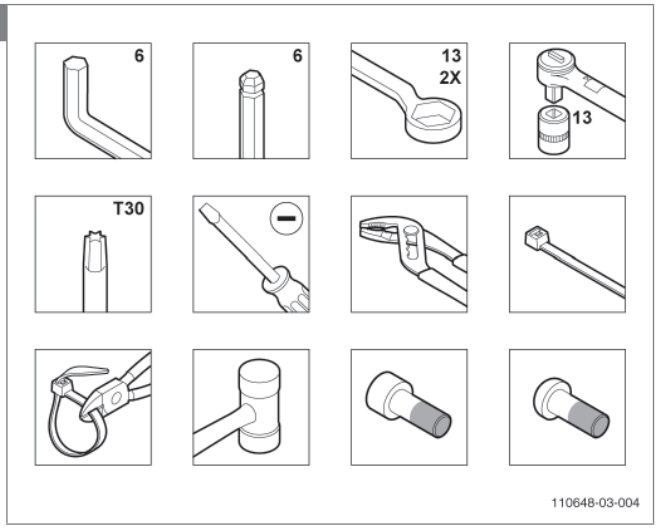
Conversion set for converting FWD to RWD.

3



Conversion set for converting RWD to FWD.

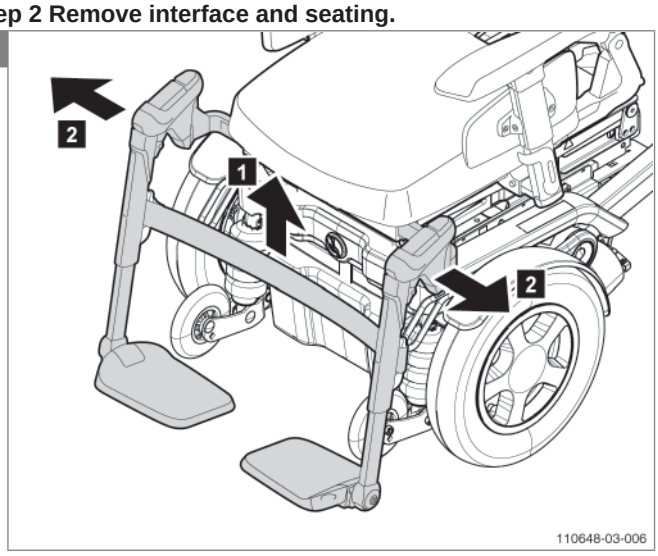
4



Tools required.

Step 2 Remove interface and seating.

1



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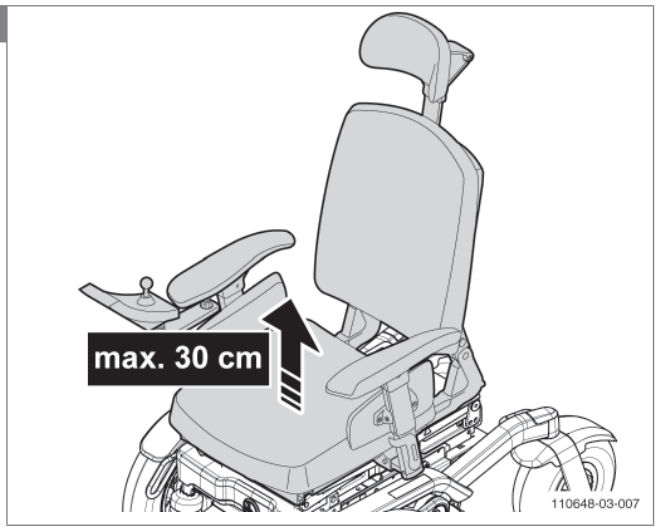
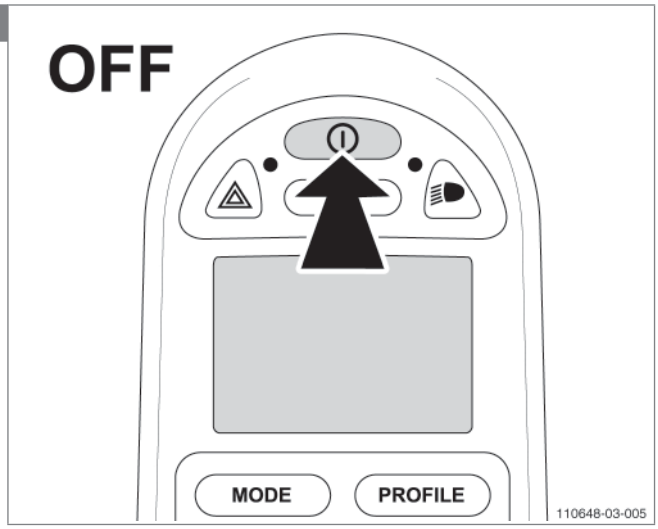


Note! Lift the chair in case the wheel chair has an electrical lift.

3



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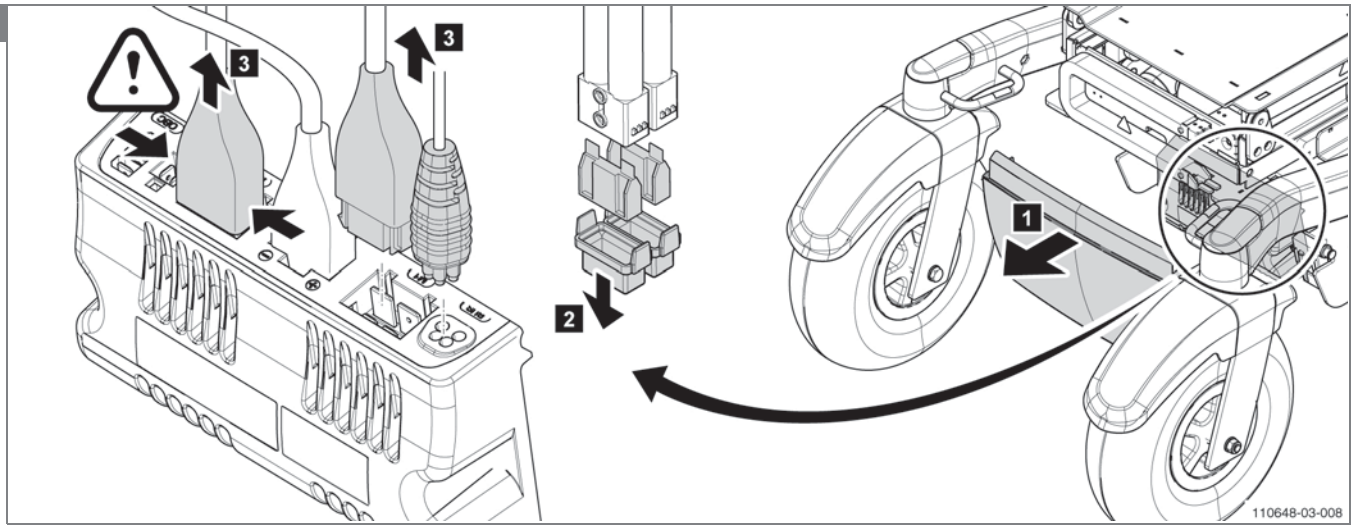

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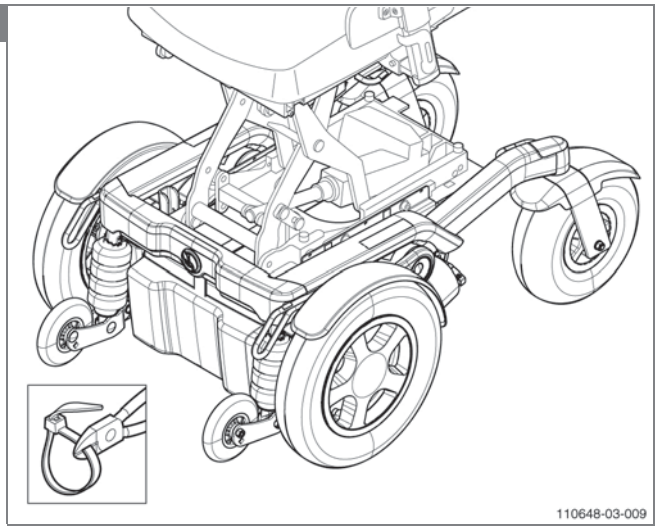

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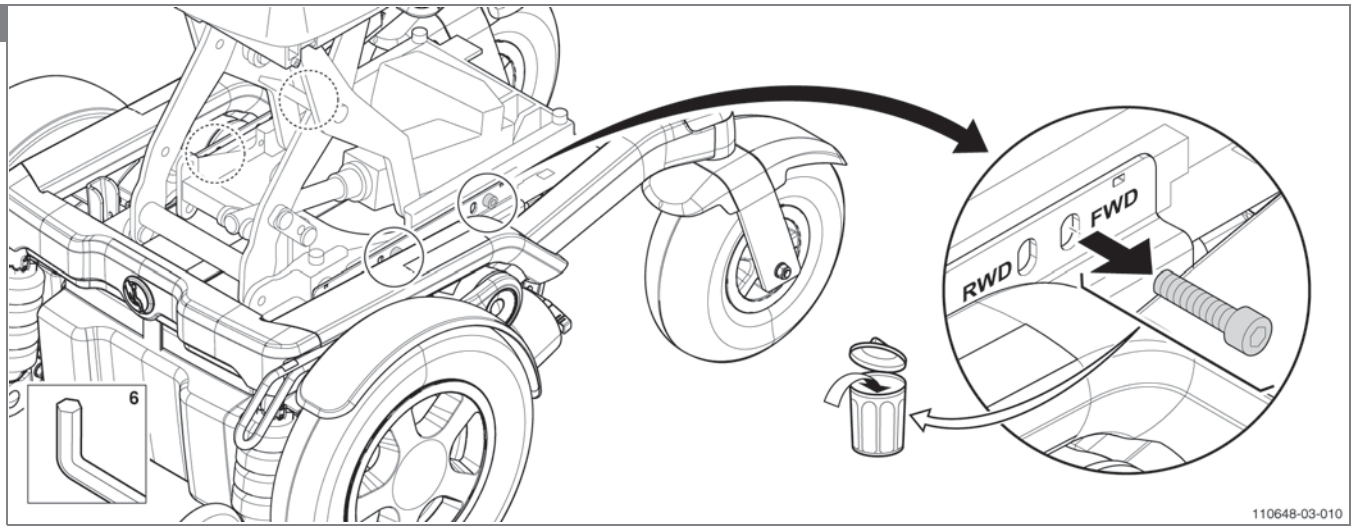

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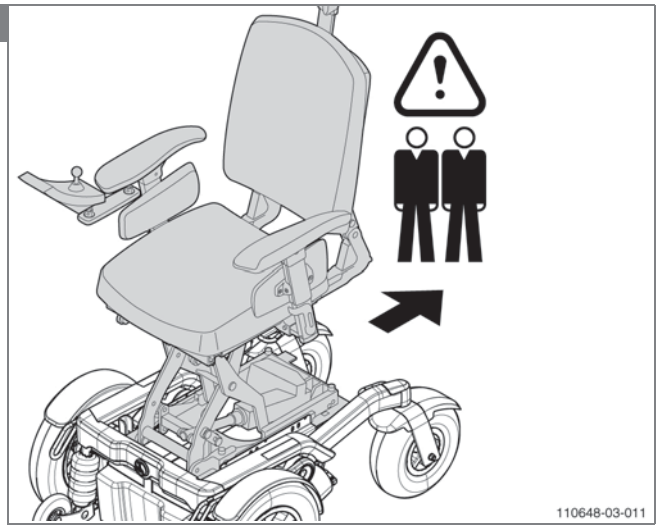
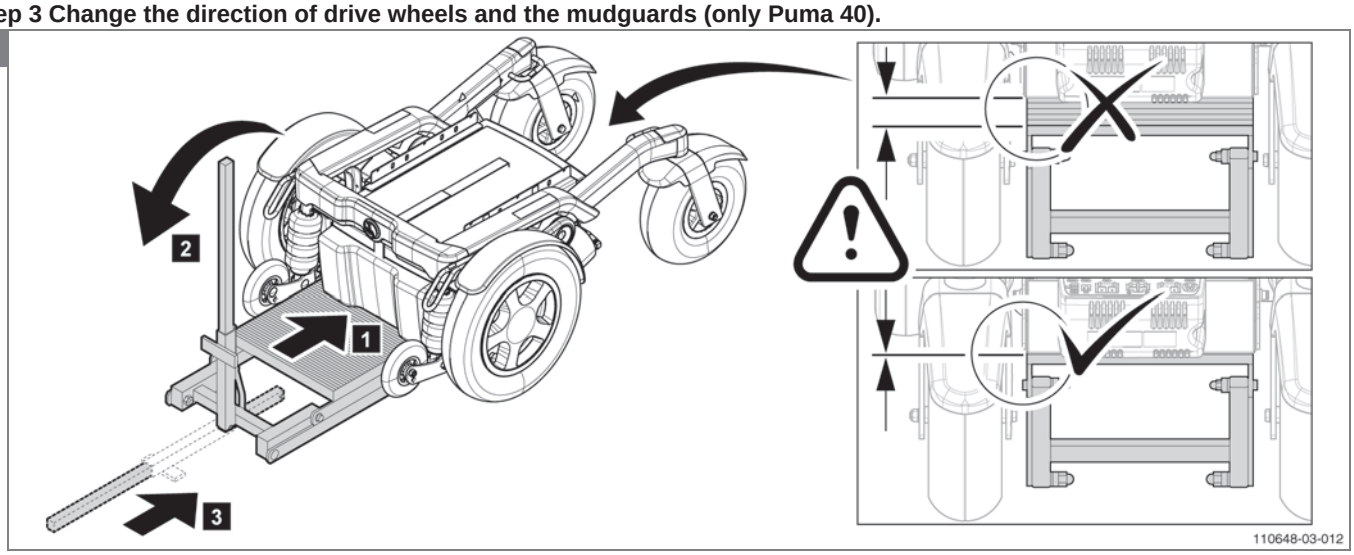


Note! Keep the spacers for reuse at step 5.2!

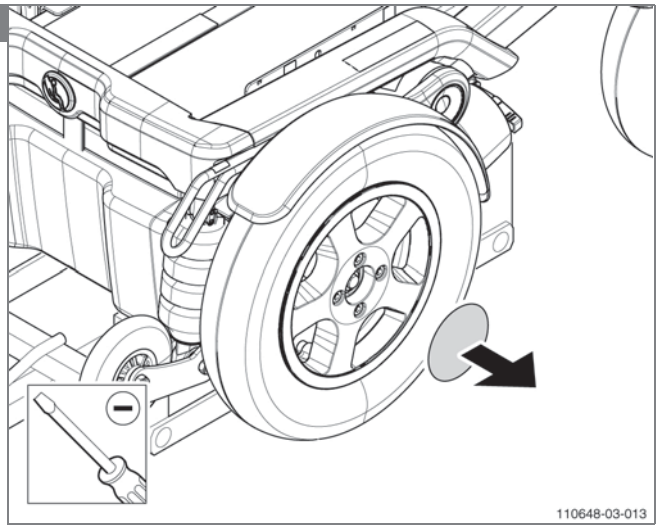
Step 3 Change the direction of drive wheels and the mudguards (only Puma 40).

1

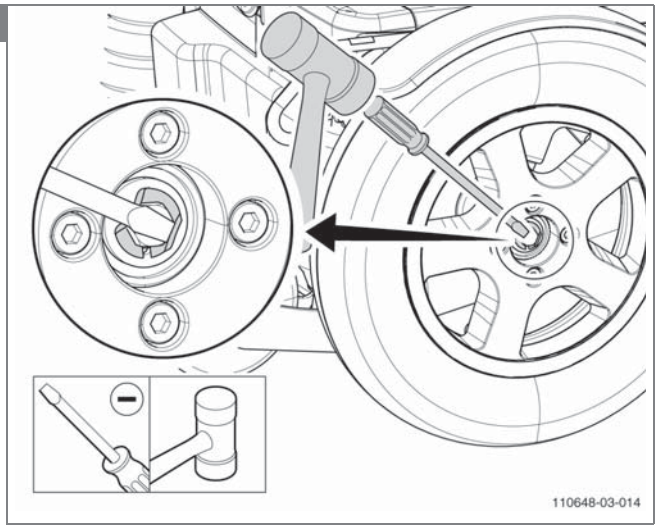


Note! Use a lifting device to provide a proper working platform.
Note! Position the lift completely under the carrier!
Caution! Check no cables are caught between the lift and the carrier!

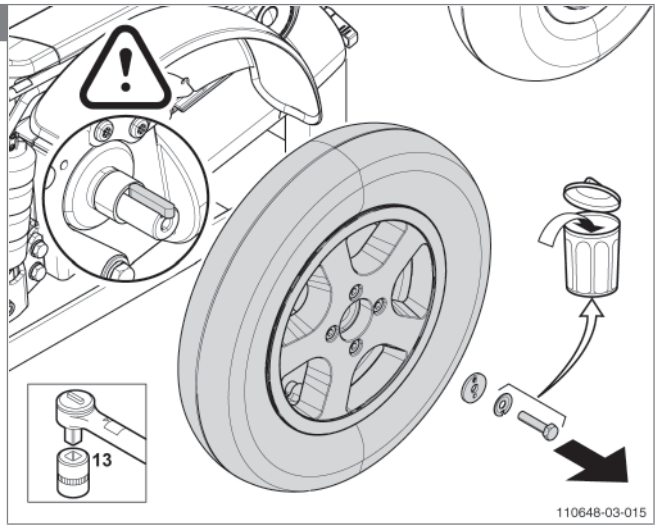
2



3

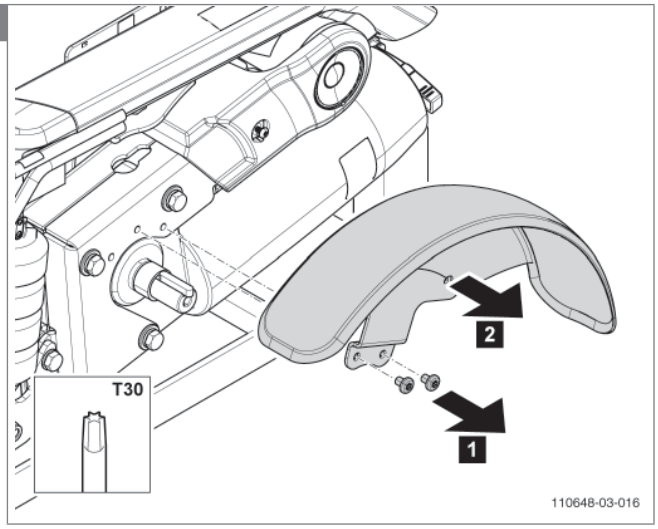


4



Note! Check the key is still in place!
Note! Dispose the ring and bolt!

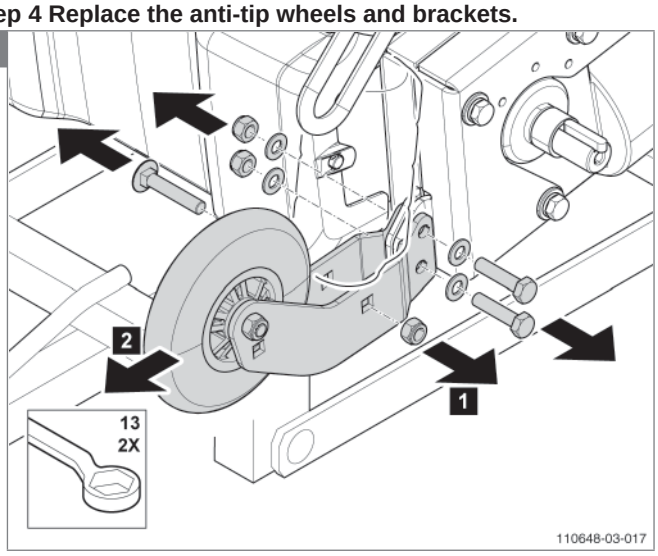
5



Note! The Puma 40 has mudguards, take them off!

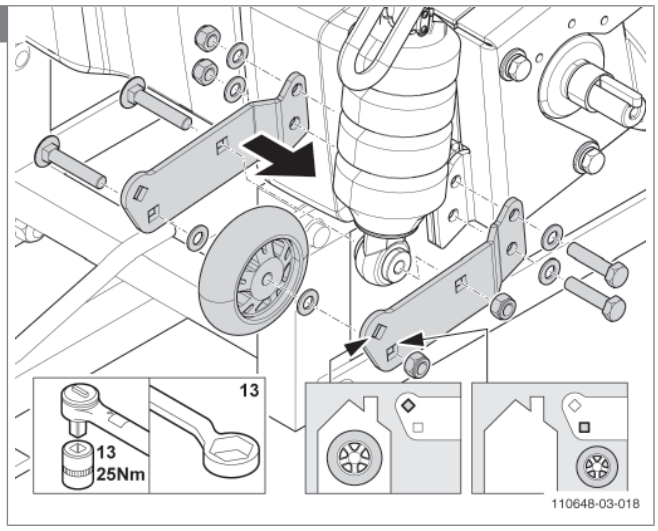
Step 4 Replace the anti-tip wheels and brackets.

1



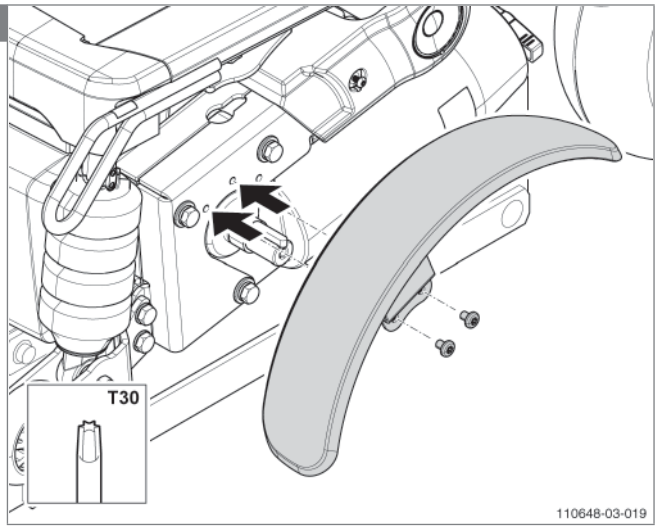
Note! Replace the anti-tip wheels and brackets! FWD into RWD!

2



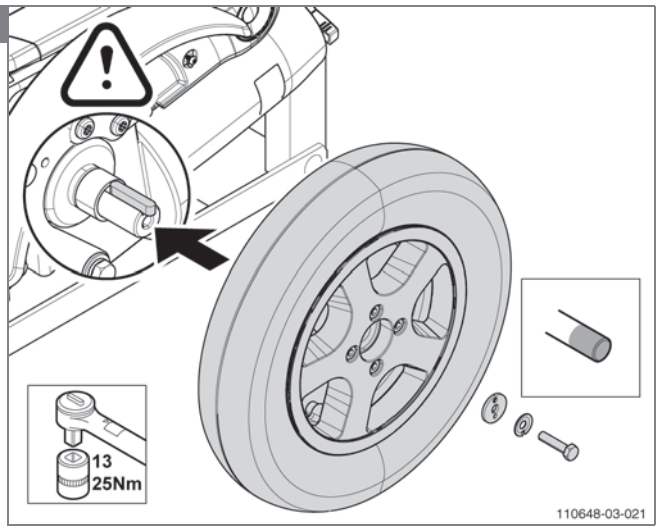
Note! Use top mounting holes for Indoor anti-tip wheel!
Note! Use bottom mounting holes for Outdoor anti-tip wheel!
Note! Tighten the bolts of the anti-tip wheels and brackets with 25 Nm!

3



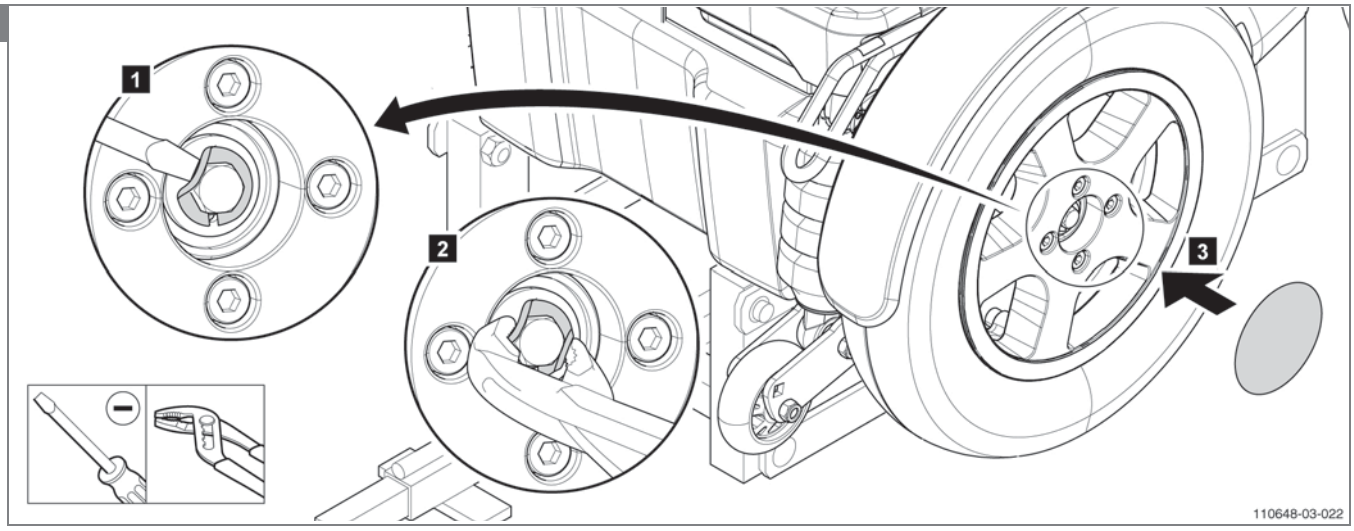
Step 5 Remount the drive wheels.

1



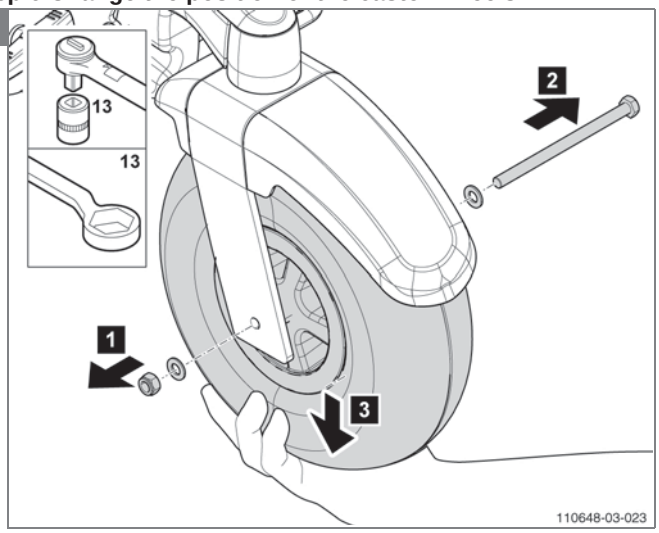
Note! Check the key is still in place!
Note! Tighten the bolts of the drive wheels with 25 Nm!

2



Step 6 Change the position of the castor wheels.

1



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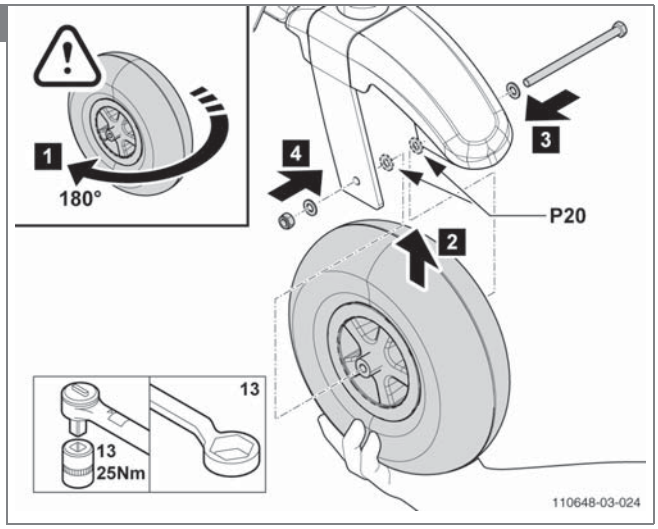
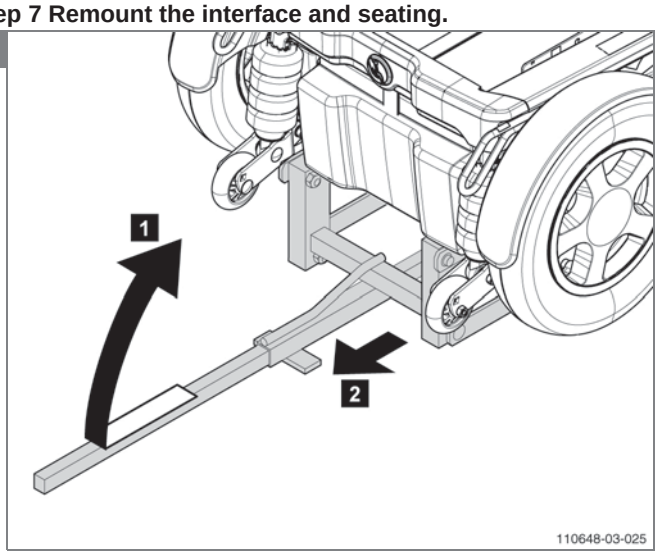


Note! Tighten the shaft and nut of the castor wheels with 25 Nm!
Caution! Place at the Puma 20 on both sides of the castor wheel an extra ring between the wheel and the fork!

Step 7 Remount the interface and seating.

1



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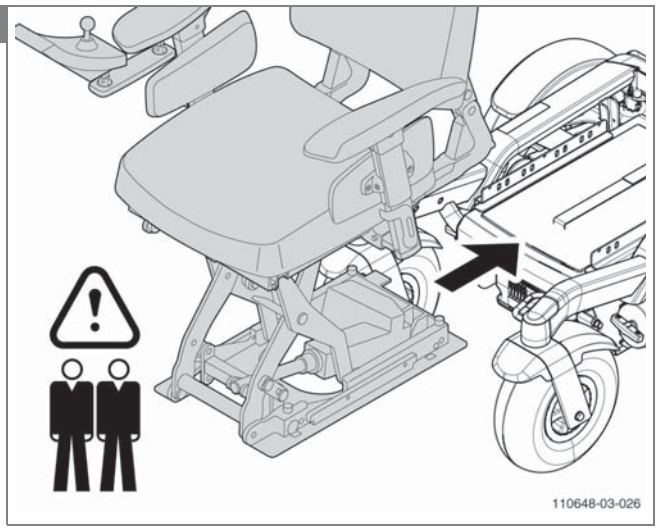

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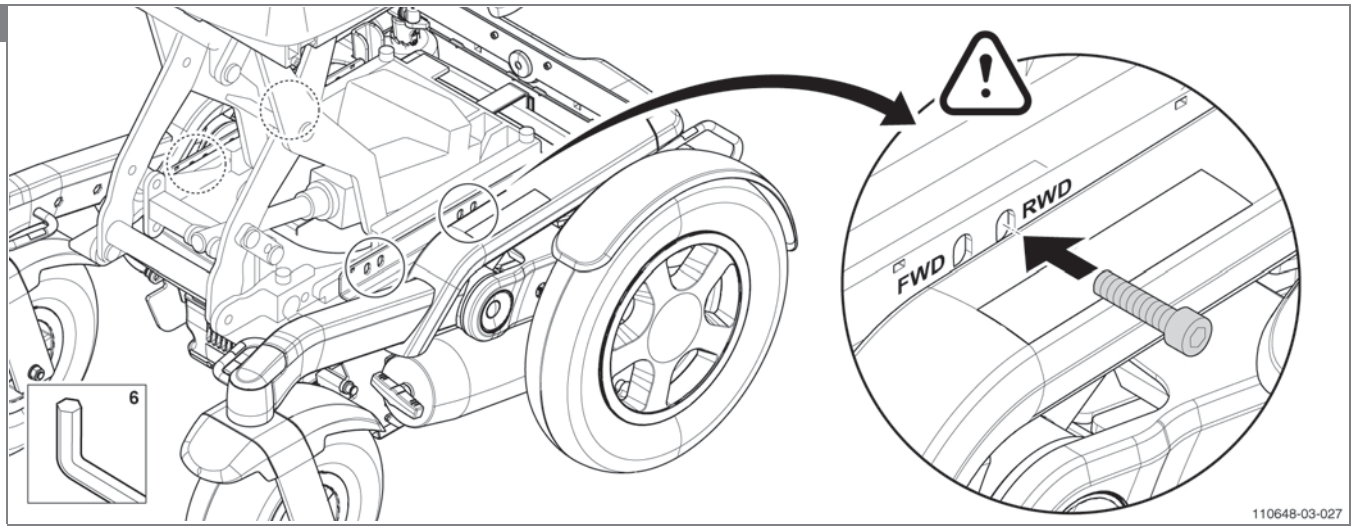

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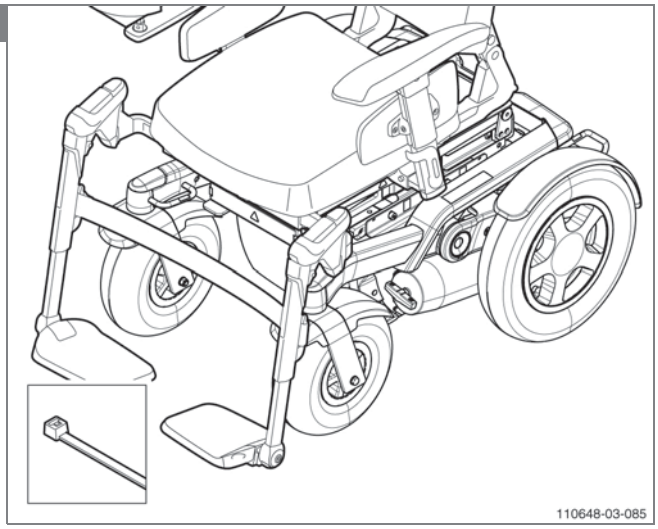

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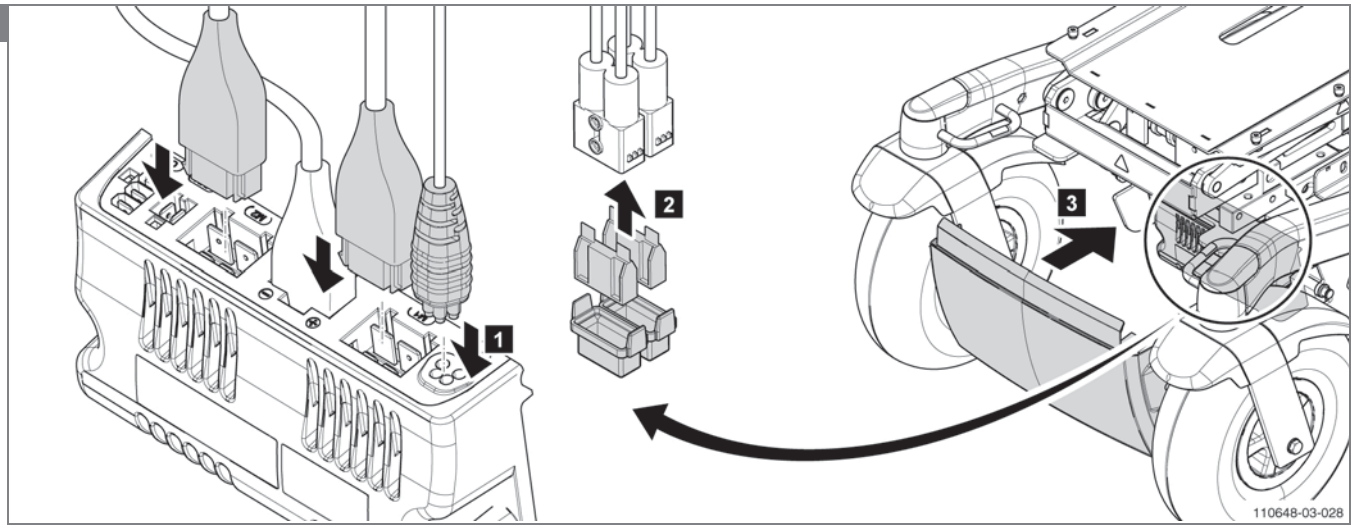

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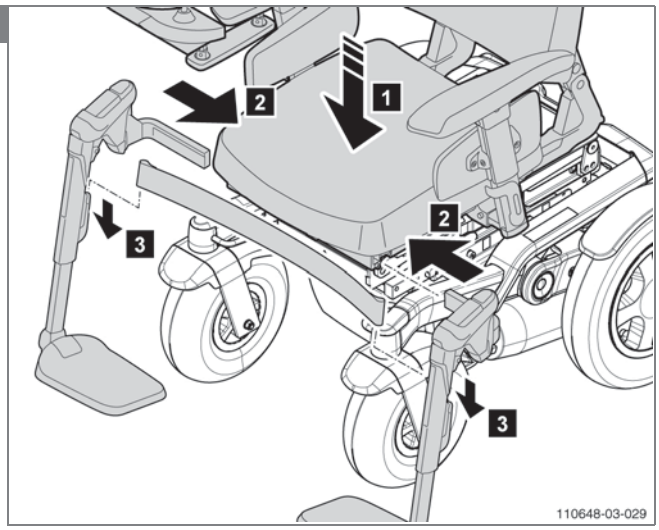


	FWD		RWD	
Shark	9006429	Shark bus extension cable 0.9m	9006430	Shark bus extension cable 1.2m
Shark with Lift	9006431	Shark bus extension cable 0.64m	9006429	Shark bus extension cable 0.9m
	9006304	P2040 Shark Cable Light+Lift+Act FWD	9006305	P2040 Shark Cable Light+Lift+Act RWD
DX2	00355.0023	DX(2) bus cable 1.0 m.-	055.00111.000	DX(2) bus cable 1.5 m.
DX2 with Lift	00355.0024	DX(2) bus cable 2.0 m.	055.00121.000	DX(2) bus cable 2.5 m.
R-net	9002481	R-net Cable 1.0m	9002484	R-net Cable 1.5m
R-net with Lift	9002482	R-net Cable 2.0m	9006434	R-net Cable 2.5m
VR-2	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m
VR-2 with attendant	9002305	VR-2 Extension Cable 0.5m	9006853	VR-2 Extension Cable 1m
VR-2 with Lift & Tilt / Back	9006854	VR-2 Extension Cable 1,5m	9006855	VR-2 Extension Cable 2m
	9006325	P2040 VR-2 Cable Lift+Act FWD	9006326	P2040 VR-2 Cable Lift+Act RWD
VR-2 with Lift	9006853	VR-2 Extension Cable 1m	9006854	VR-2 Extension Cable 1,5m
	9006328	P2040 PGDT Cable Lift 900mm	9006329	P2040 PGDT Cable Lift 1100mm

Step 8 Reprogram the wheelchair.

1

110648-03-030

Note! Program the correct standard RWD program to the wheelchair.

Mounting the kerb climber (Puma 20/40 – RWD)

Preparation
- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive wheels clear of the ground.

Instructions
The following operations are required to mount the kerb climber:
- Switch off the wheelchair via the remote control.
- Remove the leg rests.
- Mount the mounting bracket of the kerb climber on the castor arms.
- Mount the kerb climber on the mounting bracket.
- Put back the leg rest.

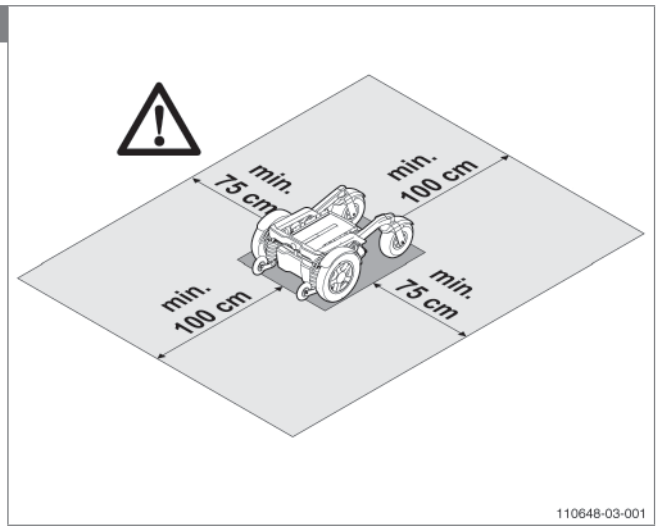
Relevant article numbers
- 9005740 Kerb climber Puma 20/40

Tools used
- Allen key, 8 mm

Notice
Note! The kerb climber can only be mounted on a RWD!
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.

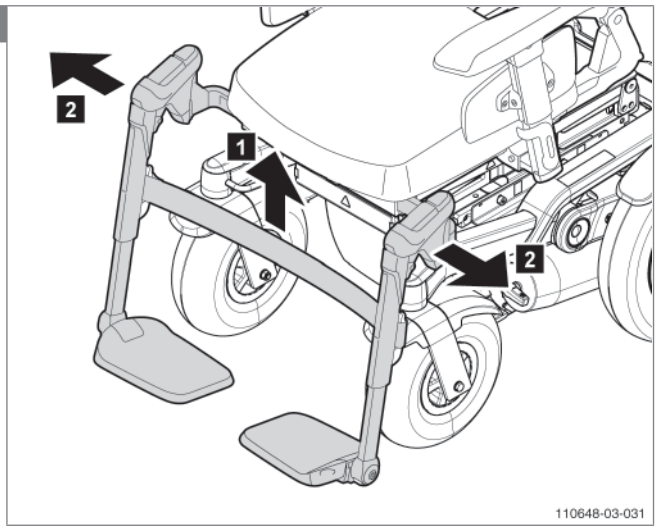
Icons
- N.a.

1



Note! Suitable work area required!

2



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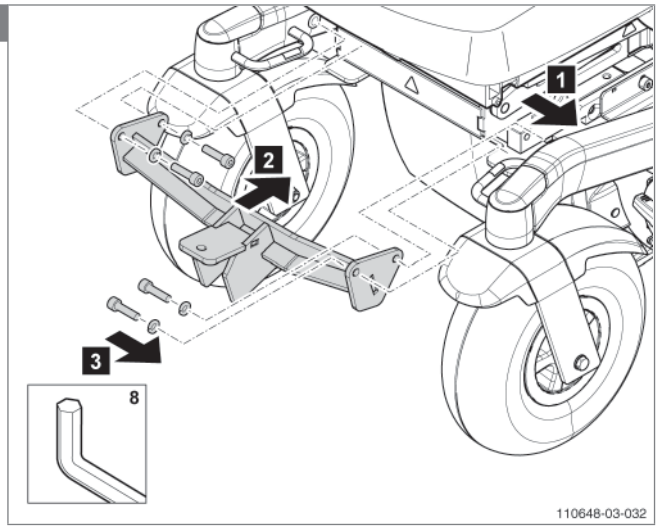

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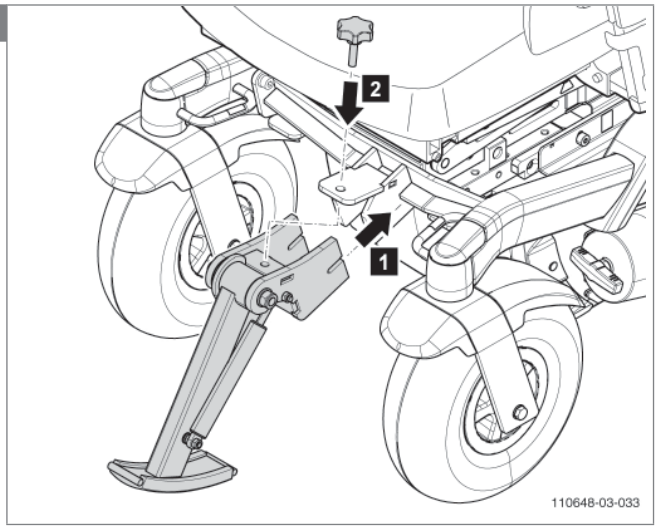

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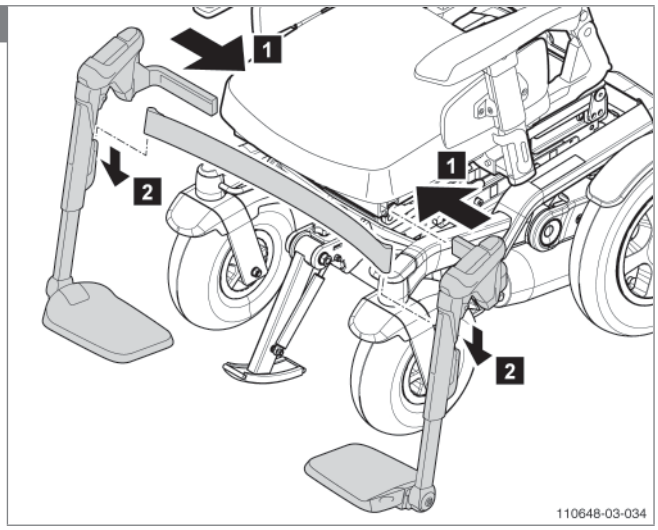


Replacing the carbon brushes (Puma 20/40)

Preparation
- Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in ‘drive’ mode. If the freewheel switch is in ‘push’ mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

Instructions
- The following operations are required to replace the 4 or 8 carbon brushes:
- Remove the bolt/nut and the locking washers of the drive wheel.
- Remove the drive wheel from the motor axle.
- Remove the mudguards and the anti-tip wheels.
- Loosen the three bolts from motor arm to loosen the motor.
- Unscrew the 2 or 4 caps to get access to the carbon brushes.
- Pull the carbon brush out of the housing and remove the brush.
- Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.
- Place the carbon brush in the holder; this can be done in one way only.
- Screw the new plastic screw cap onto the carbon brush holder.
- Mount the motor, mudguard, anti-tip wheel and driving wheel on the carrier.
- Check the tyre pressures.

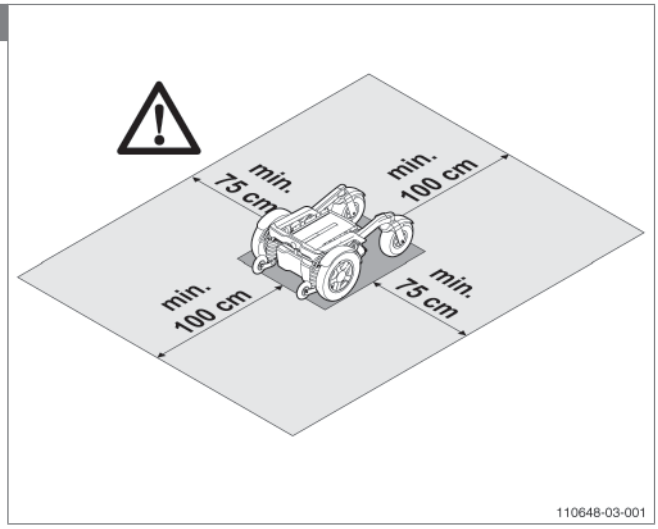
Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.
- Some parts need to be replaced; the replacement is indicated by a symbol.
- Make sure the wheelchair is switched off.

Relevant article numbers
- 9006360 Puma 20 Motor brush set (2x2pcs with cover)
- 9006361 Puma 40 Motor brush set (2x2pcs with cover)
- 9005107 4P HT Motor brush set (2x4pcs with cover)
- 9002600 Drive wheel bolt and ring
- If complete drive units need to be replaced see spare parts list for article numbers:
  Puma 20 - 35 Carrier and seat adjustments / Suspension arm and motors Puma 20
  Puma 40 - 36 Carrier and seat adjustments / Suspension arm and motors Puma 40

Tools used
- Lifting device
- Screwdriver
- Hammer (plastic)
- Open ended or ring spanner, 13 mm
- Torque wrench, socket, 13 mm
- Torx key, T30
- Water pump pliers

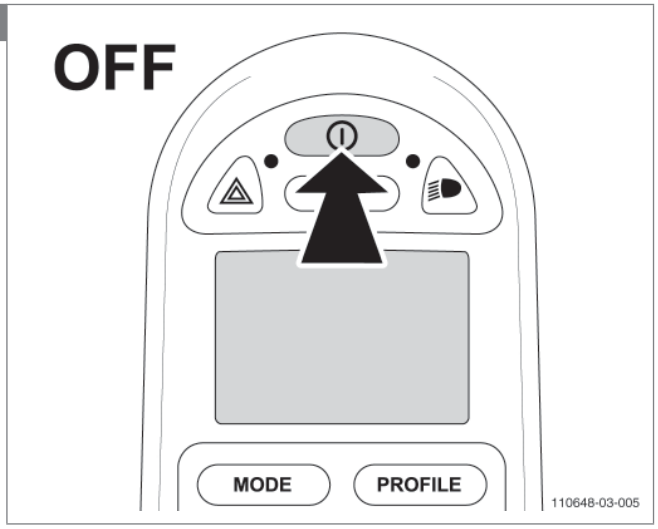
Icons
- Dispose of waste parts in accordance with local regulations.
- Bolts are provided with Loctite thread locker!
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

2



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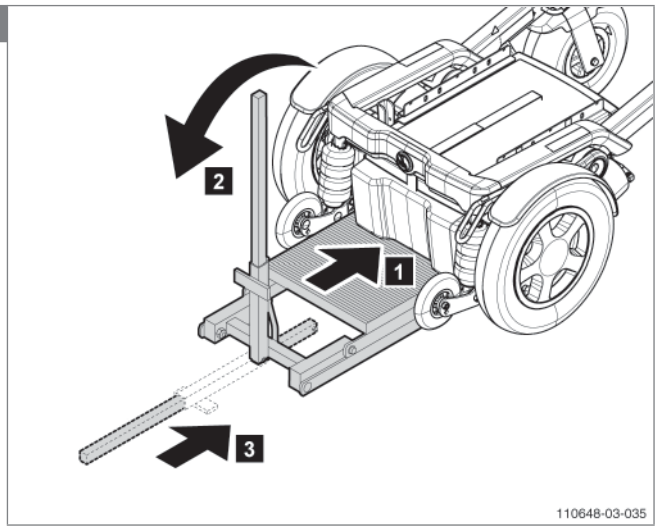
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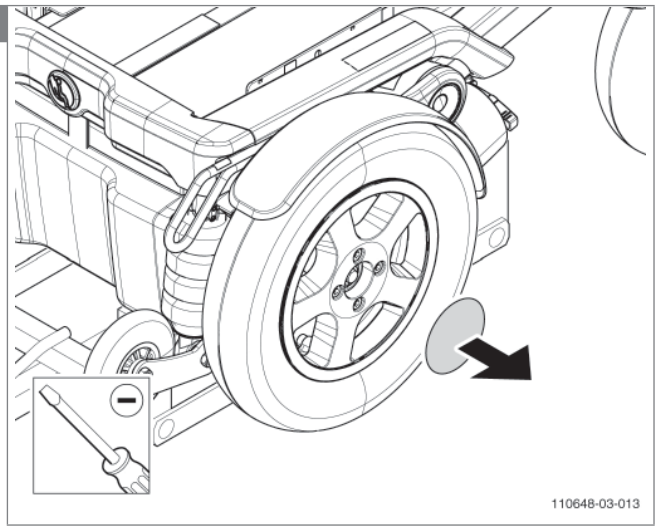
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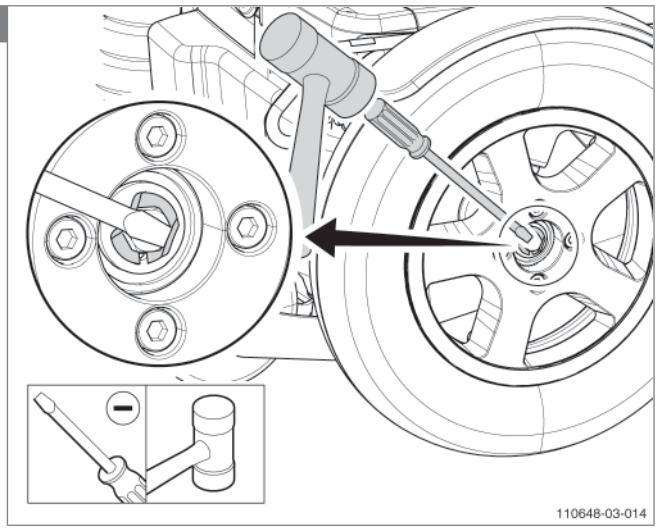
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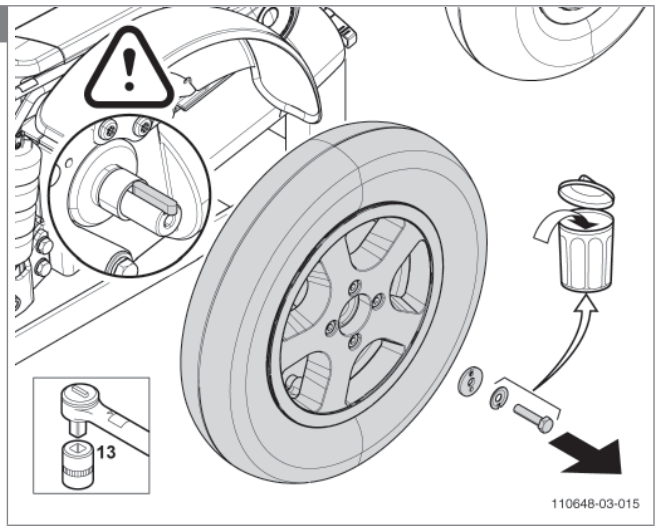
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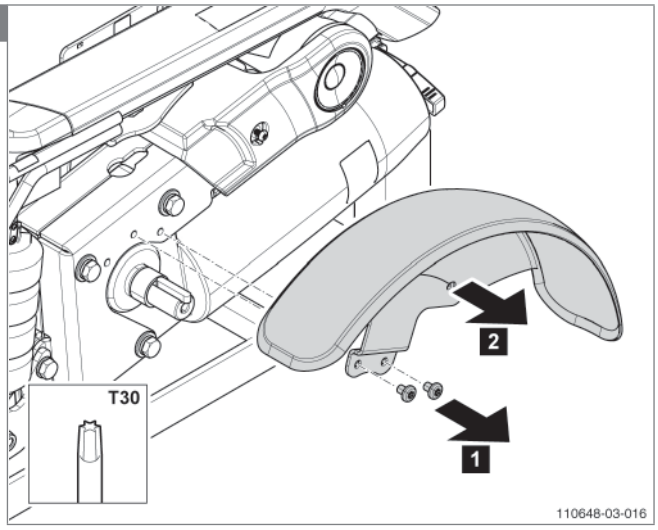
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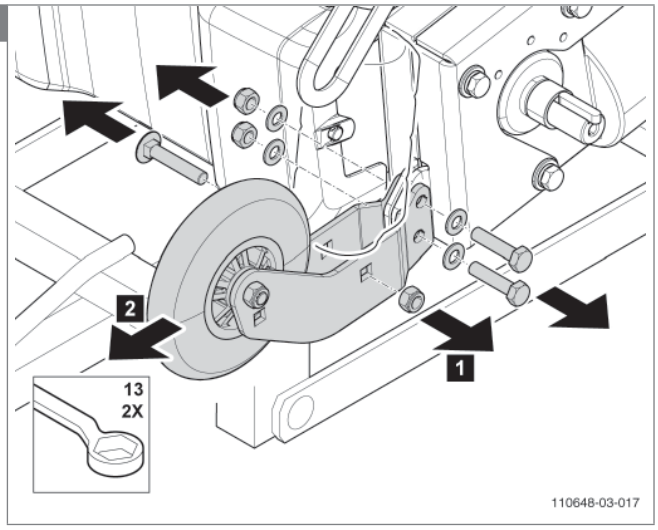
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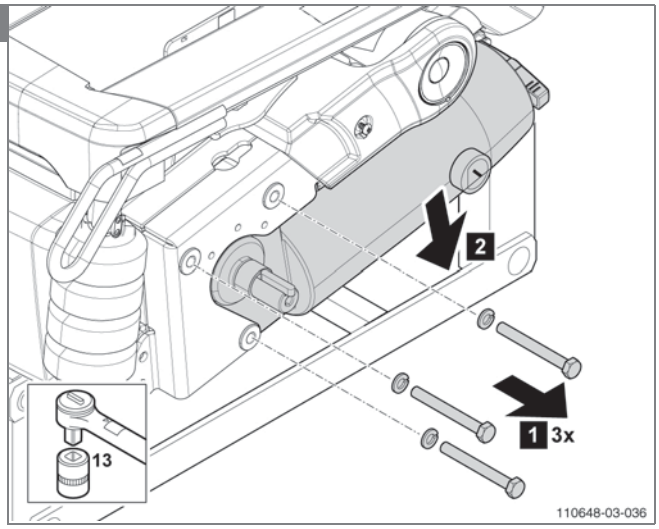

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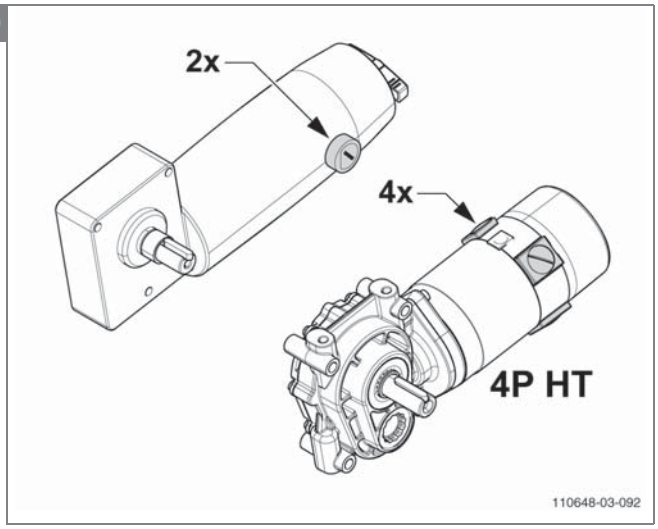

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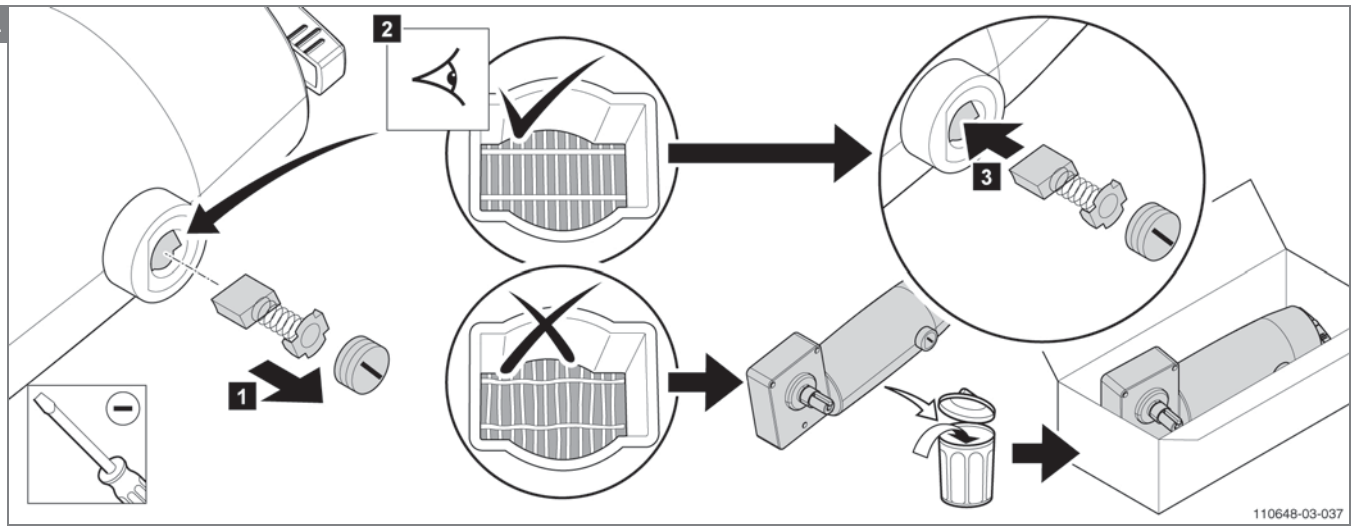
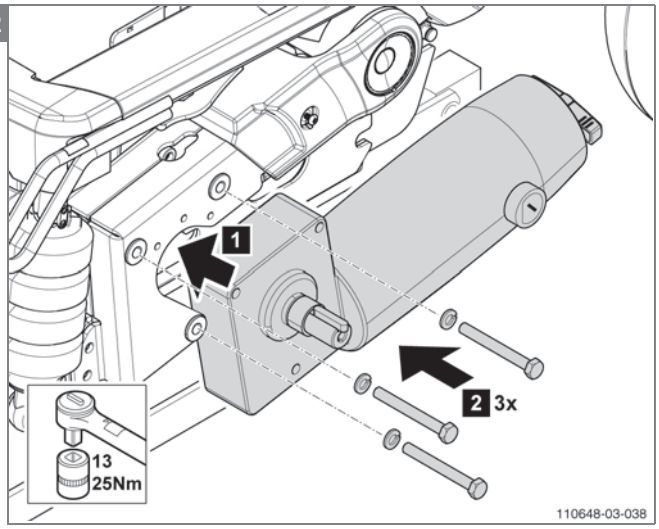


Note! Inspect the collector on the anchor of the motor; if the collector is seriously worn, replace the entire drive unit.

12



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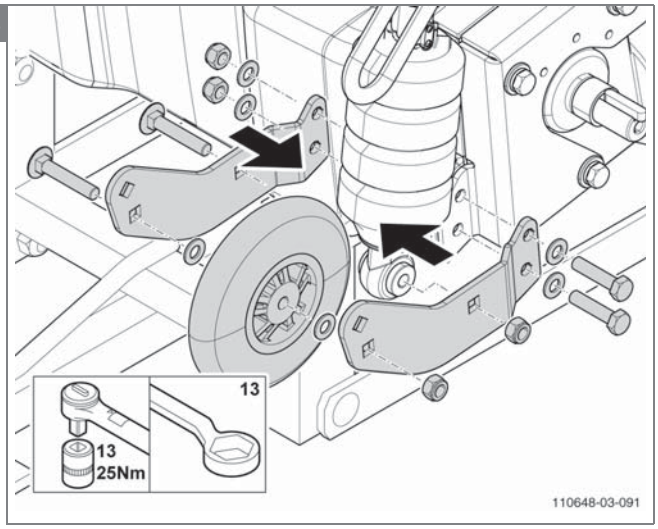

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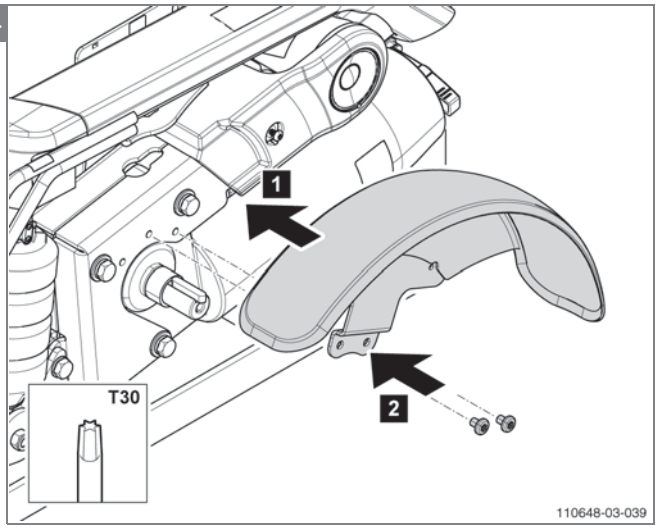

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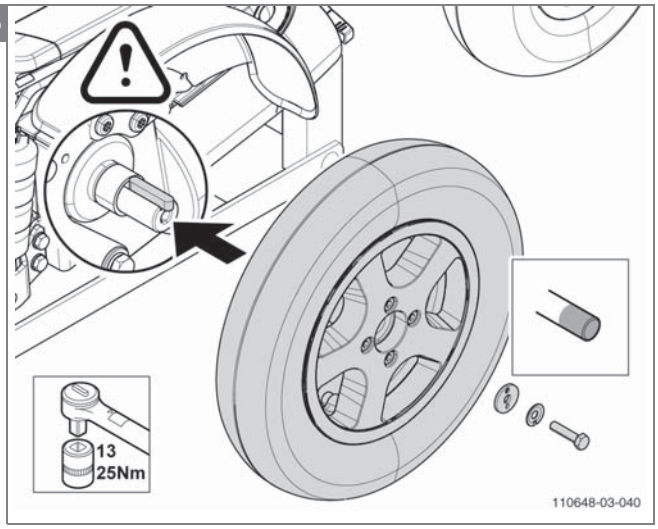
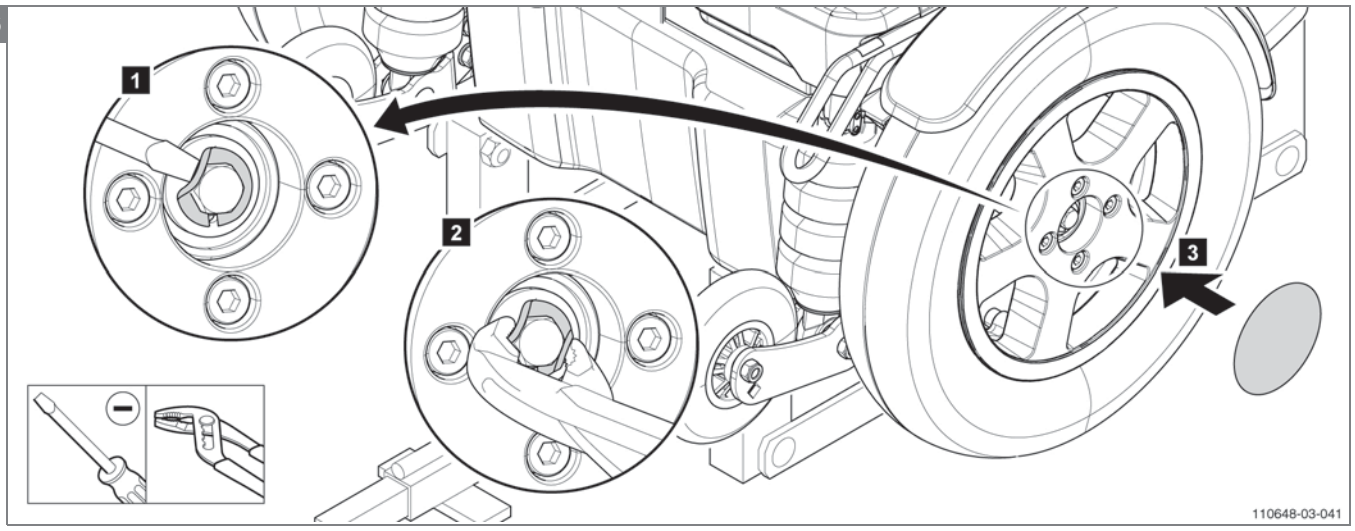


Note! Check the key is still in place!
Note! Tighten the bolts of the drive wheels with 25 Nm!
Note! Bolts are provided with Loctite thread locker!

16



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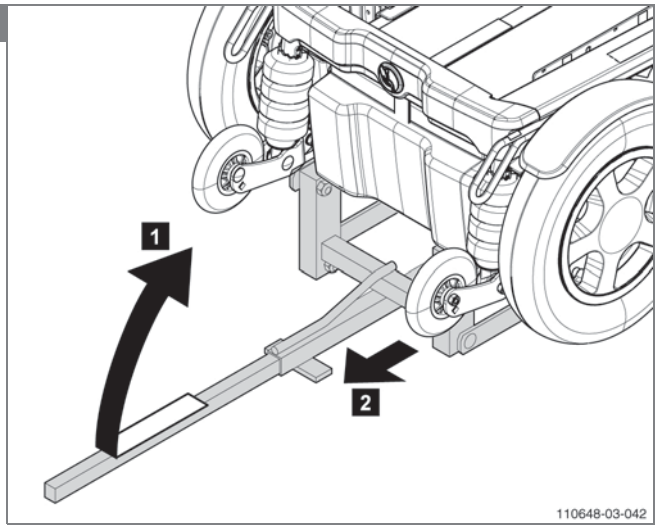


5.2.2 Driving wheels (Puma 20/40)

Replacing the drive wheel, indoor/outdoor

Preparation
- Switch off the wheelchair via the remote control.
- Be sure that the freewheel switch is in ‘drive’ mode. If the freewheel switch is in ‘push’ mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

Instructions
- The following operations are required to replace the driving wheel:
- Remove the cap, unlock the locking plate, remove the bolt and the locking washer.
- Replace the new drive wheel.
- Screw the bolt with ring and a new locking plate into the shaft, lock the locking plate and put the cap back again.
- Check the tyre pressures.

Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.
- Inflate the tube to the correct pressure! (See ‘Technical specifications’)

Relevant article numbers

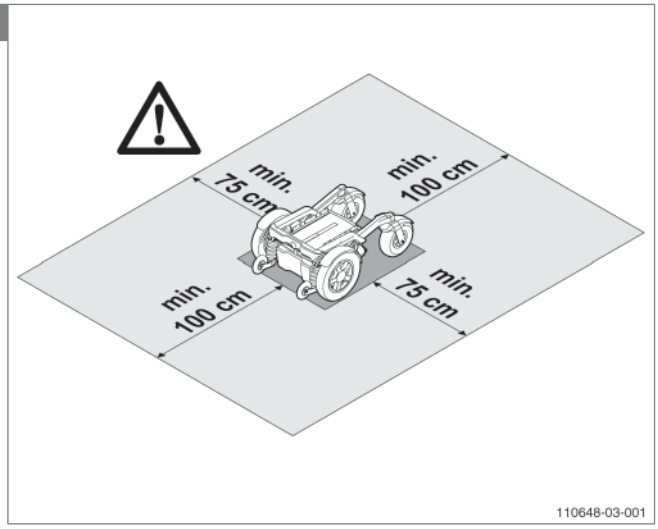
Puma 20
- 00000.1703 Lock nut M10 P20
- 9005992 Drive wheel Indoor 12 1/2 x 2 1/4, air
- 9005995 Drive wheel Indoor 12 1/2 x 2 1/4, puncture proof
- 9005993 Drive wheel outdoor 3.00-8, grey air
- 9005996 Drive wheel outdoor 3.00-8, grey puncture proof

Puma 40
- 9002600 Drive wheel bolt and ring P40
- 9006009 Drive wheel indoor 12 1/2 x 2 1/4, air
- 9006012 Drive wheel indoor 12 1/2 x 2 1/4, puncture proof
- 9006010 Drive wheel outdoor 3.00-8, grey air
- 9006013 Drive wheel outdoor 3.00-8, grey puncture proof
- 9006011 Drive wheel outdoor 3.00-8, black air
- 9006014 Drive wheel outdoor 3.00-8, black puncture proof

Tools used
- Lifting device
- Screwdriver
- Hammer (plastic)
- Torque wrench, socket, 13 mm
- Water pump pliers

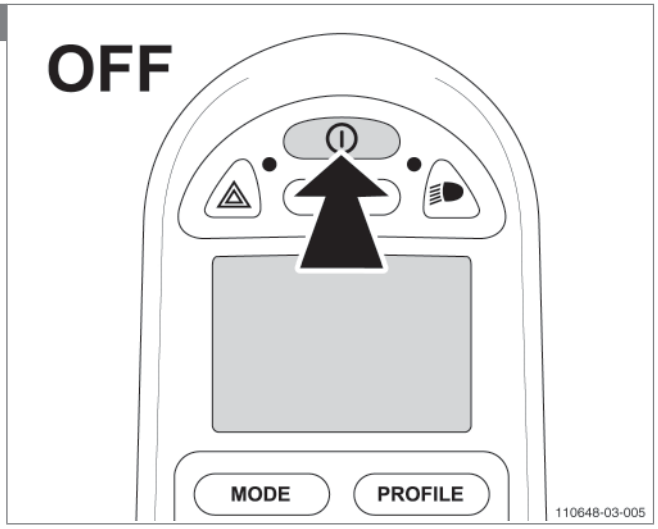
Icons
- Dispose of waste parts in accordance with local regulations
- Bolts are provided with Loctite thread locker!
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

2



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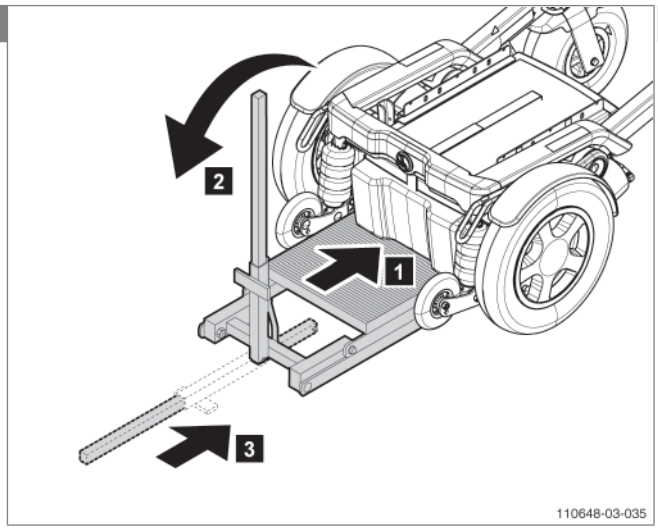

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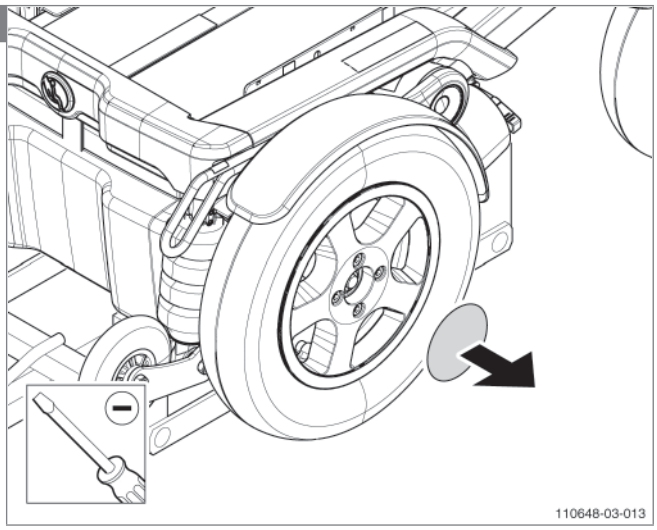

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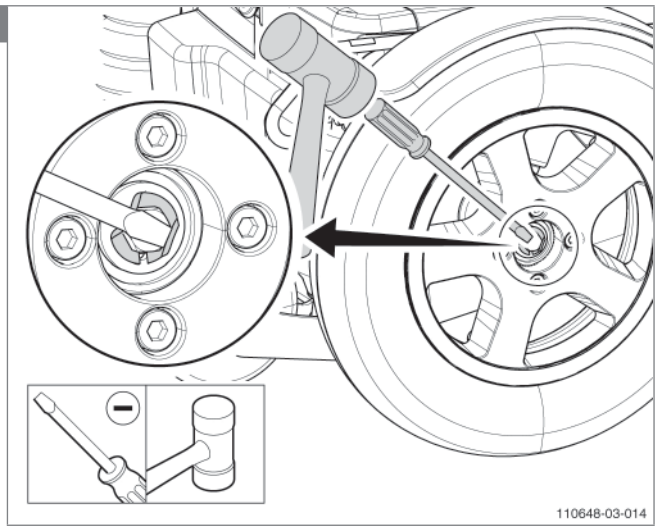

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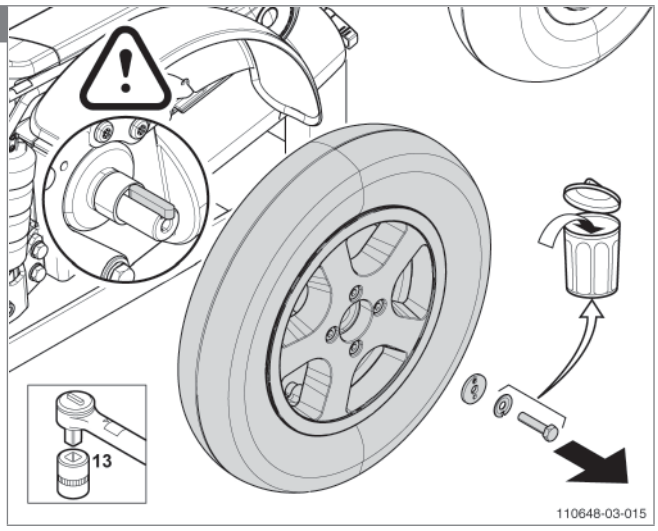

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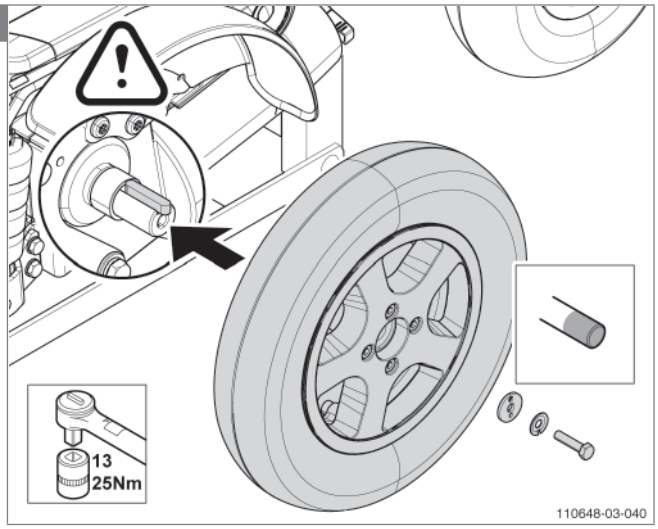
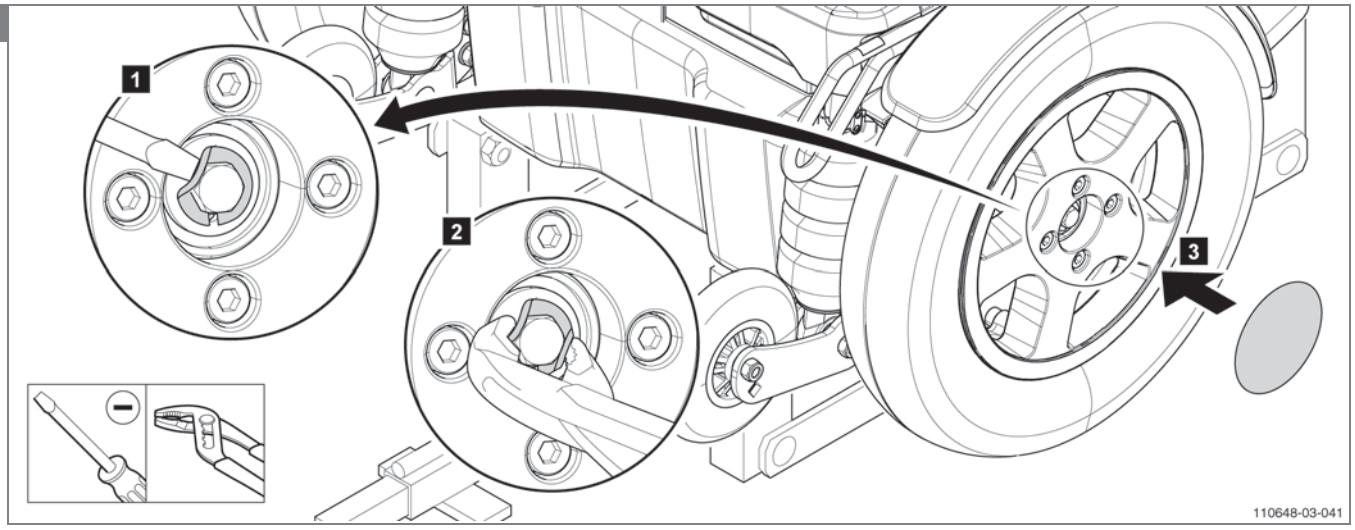


Note! Check the key is still in place!
Note! Tighten the bolts of the drive wheels with 25 Nm!
Note! Bolts are provided with Loctite thread locker!

8



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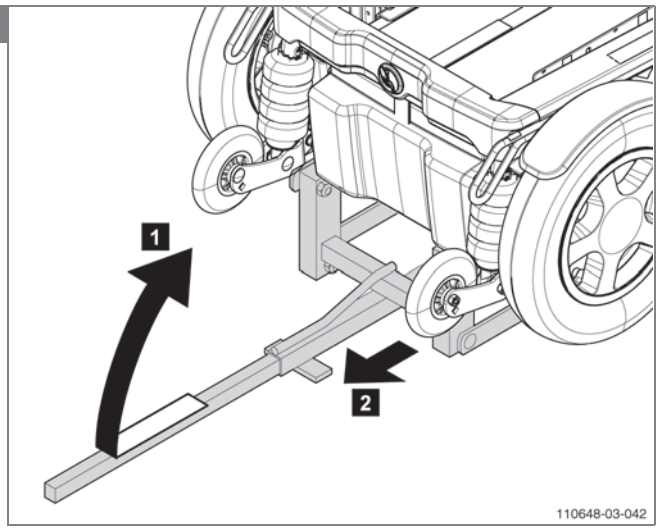


Replacing the tube and/or tyre of a drive wheel, indoor/outdoor

Preparation
- Be sure that the freewheel switch is in ‘drive’ mode. If the freewheel switch is in ‘push’ mode this will make loosening the bolts impossible.
- Use a lifting device to raise the drive wheels clear of the ground.

Instructions
- The following operations are required to replace the tube and/or tyre of the driving wheel:
- Remove the wheel from the axle. (See instruction: Replacing the drive wheel, indoor/outdoor)
- Deflate the tyre (not necessary for replacing the complete drive wheel!).
- Loosen all Allen bolts and remove the front of the rim half.
- Remove the tyre and the tube, replace a new tube and/ or tyre.
- Replace the tyre and tube on the rim half.
- Mount the front of the rim half.
- Replace the drive wheel on the axle.
- Inflate the tube to the correct pressure. (See: ‘Technical specifications’)

Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.
- Inflate the tube to the correct pressure! (See ‘Technical specifications’)

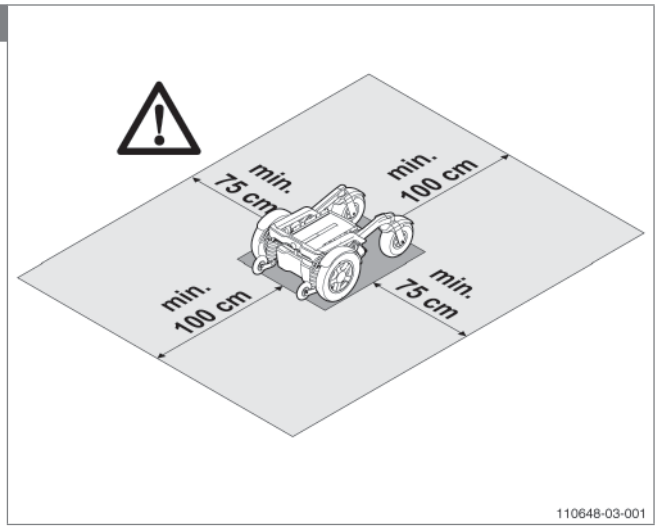
Relevant article numbers
Puma 20
- 00000.1703 Lock nut M10 P20

Puma 40
- 9002600 Drive wheel bolt and ring P40

Tools used
- Lifting device
- Screwdriver
- Hammer (plastic)
- Torque wrench, socket, 13 mm
- Allen key, 6 mm

Icons
- Dispose of waste parts in accordance with local regulations
- Bolts are provided with Loctite thread locker!
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

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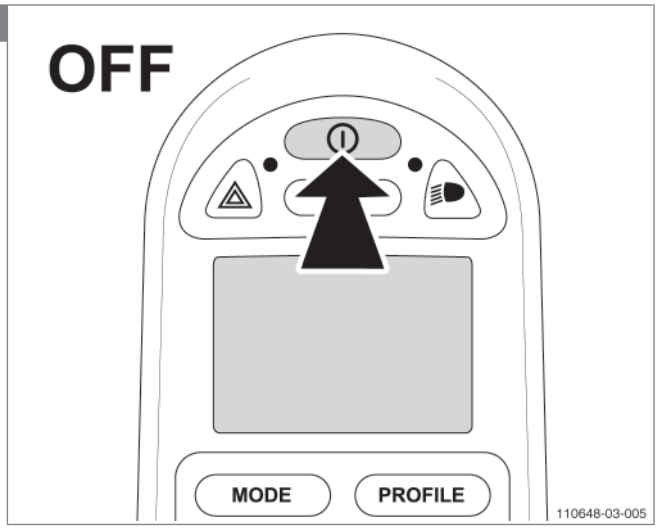

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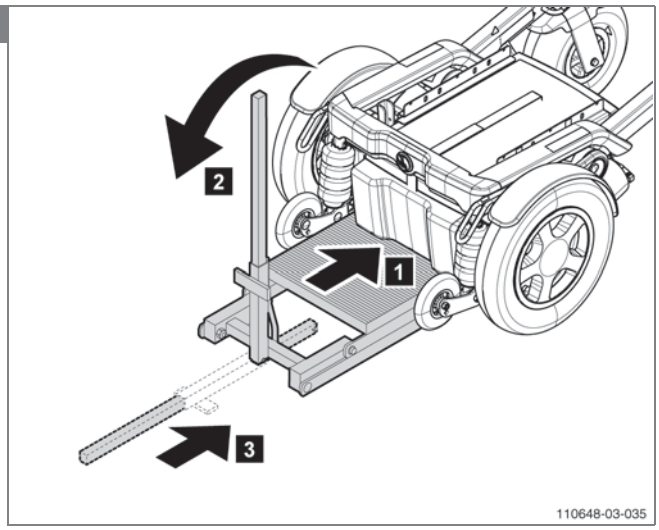

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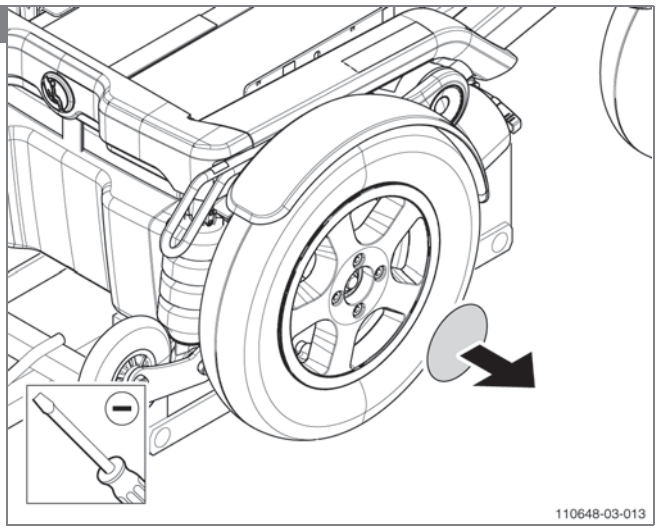

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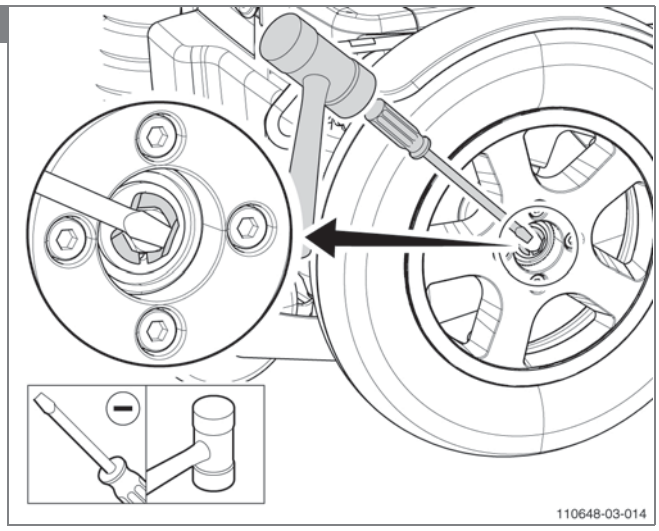

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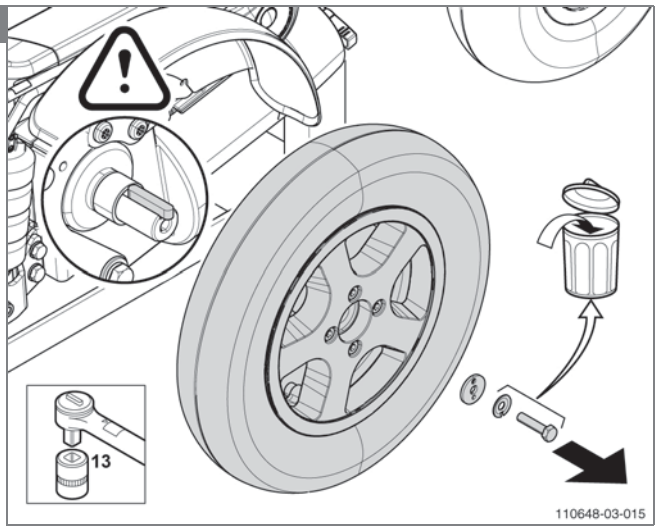

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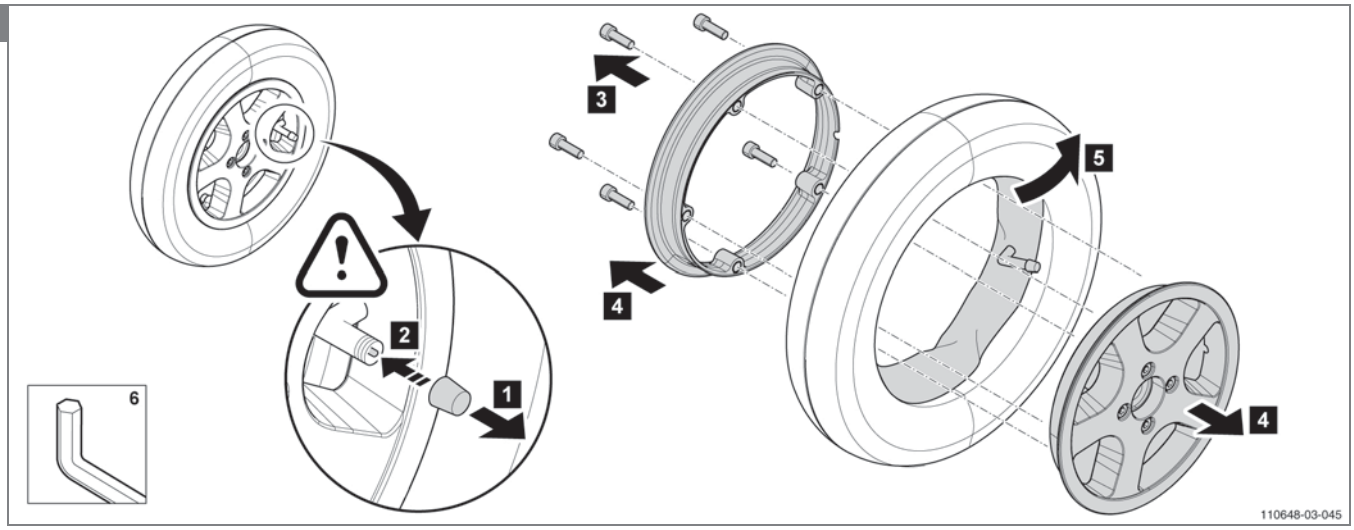
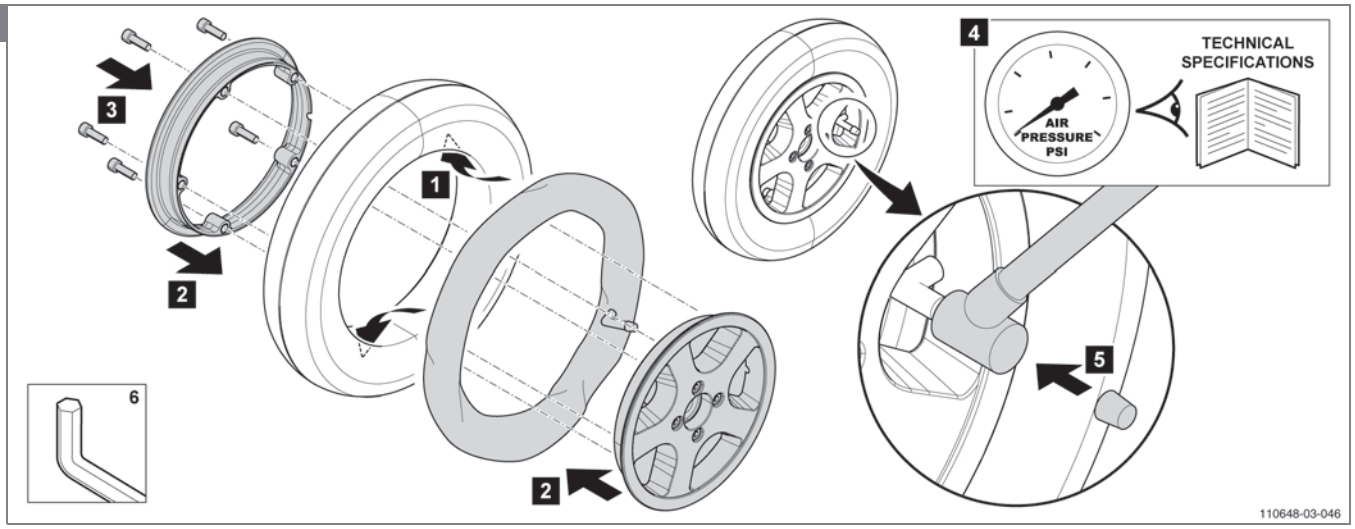


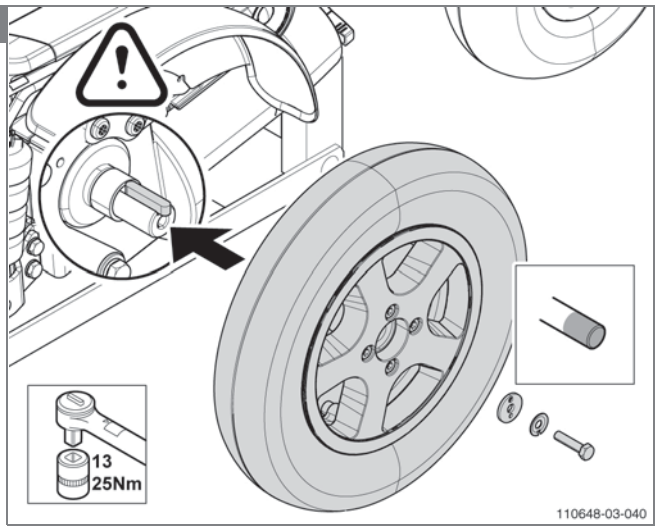
Caution! Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!

8



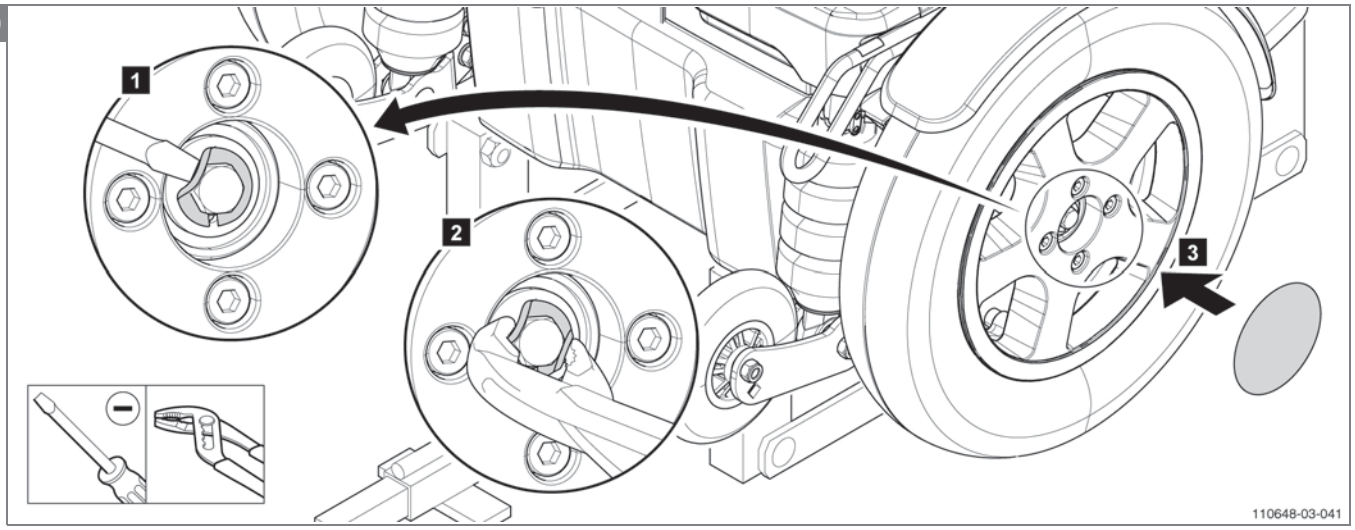
Caution! Ensure tube and tyre are properly positioned on the rim!
Caution! Make sure the tube is not jammed between the two rim halves!
Note! Inflate the tube to the correct pressure! (See: 'Technical specifications')

9



Note! Check the key is still in place!
Note! Tighten the bolts of the drive wheels with 25 Nm!
Note! Bolts are provided with Loctite thread locker!

10



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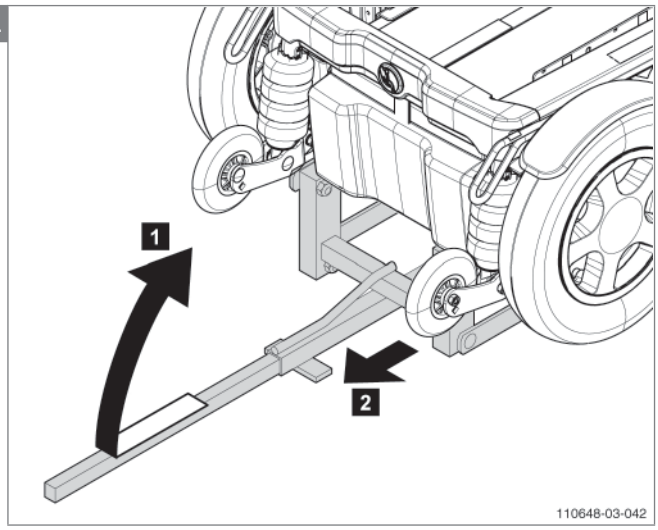


5.2.3 Castor wheels

Replacing the castor wheel

Preparation
- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive and castor wheels clear of the ground.

Instructions
The following operations are required to replace the castor wheels:
- Loosen the shaft and locking nut.
- Hold the wheel tight and remove the shaft.
- Take the castor wheel out of the fork.
- Mount the new castor wheel in the reverse order.

Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.

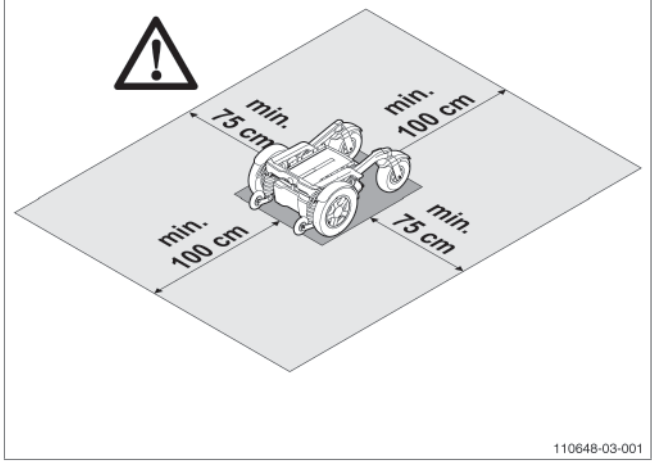
Relevant article numbers
Puma 20
- 9005986 Castor wheel indoor 2.80/2.50-4, air
- 9005989 Castor wheel indoor 2.80/2.50-4, puncture proof
- 9005987 Castor wheel outdoor right 3.00-4, grey air
- 9006820 Castor wheel outdoor left 3.00-4, grey air
- 9005990 Castor wheel outdoor 3.00-4, grey puncture proof

Puma 40
- 9005998 Castor wheel Indoor 2.80/2.50-4, air
- 9006003 Castor wheel indoor 2.80/2.50-4, puncture proof
- 9006000 Castor wheel outdoor right 3.00-4, grey air
- 9005999 Castor wheel outdoor left 3.00-4, grey air
- 9006005 Castor wheel outdoor right 3.00-4, grey puncture proof
- 9006004 Castor wheel outdoor left 3.00-4, grey puncture proof
- 9006002 Castor wheel outdoor right 3.00-4, black air
- 9006001 Castor wheel outdoor left 3.00-4, black air
- 9006007 Castor wheel outdoor right 3.00-4, black puncture proof
- 9006006 Castor wheel outdoor left 3.00-4, black puncture proof

Tools used
- Lifting device
- Open-ended or ring spanners, 13 mm
- Torque wrench, socket, 13 mm

Icons
- N.a.

1



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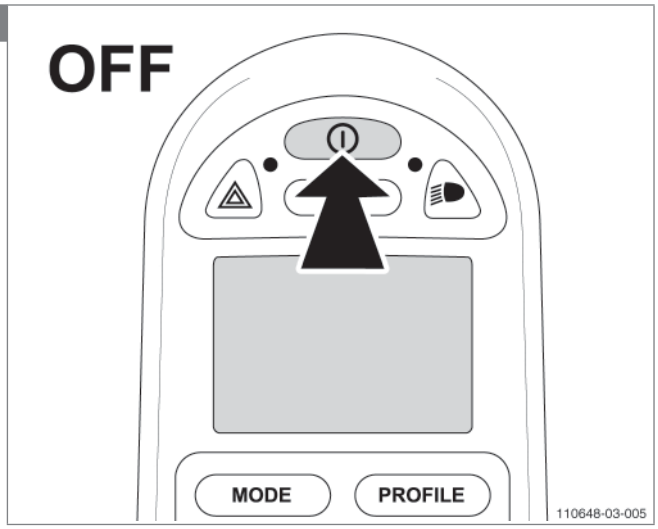
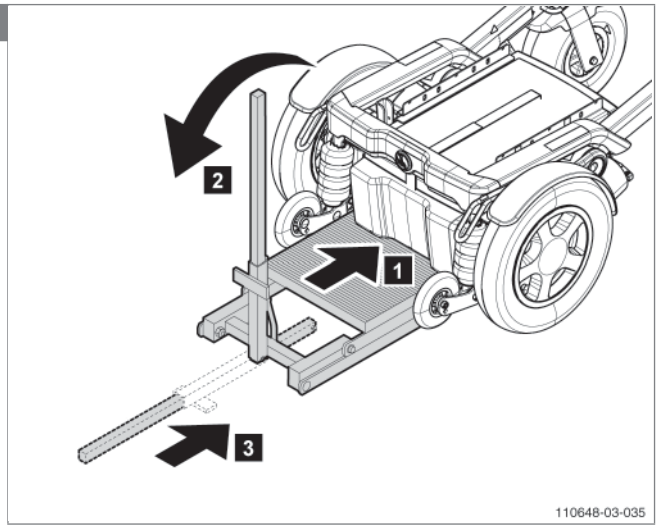


Note! Suitable work area required!

3



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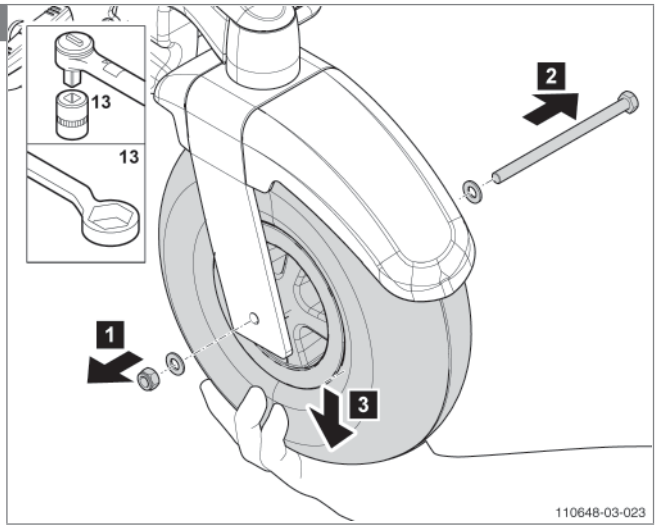

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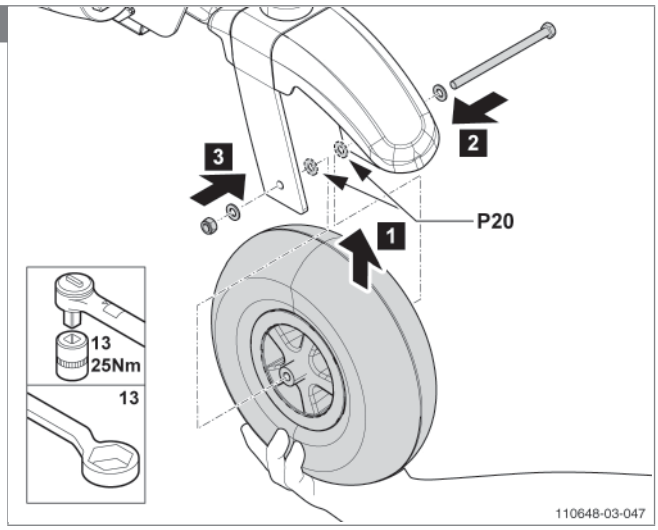

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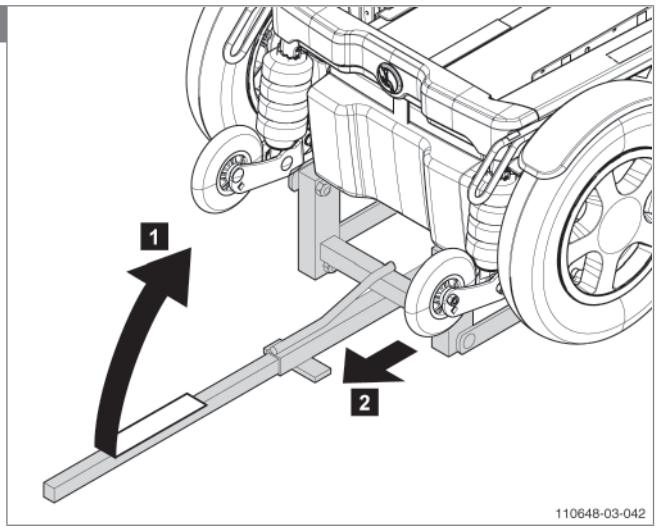


Note! Tighten the shaft and nut of the castor wheels with 25 Nm!
Caution! Place at the Puma 20 on both sides of the castor wheel an extra ring between the wheel and the fork!

Replacing the tyre and/or tube of the castor wheel

Preparation
- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive and castor wheels clear of the ground.

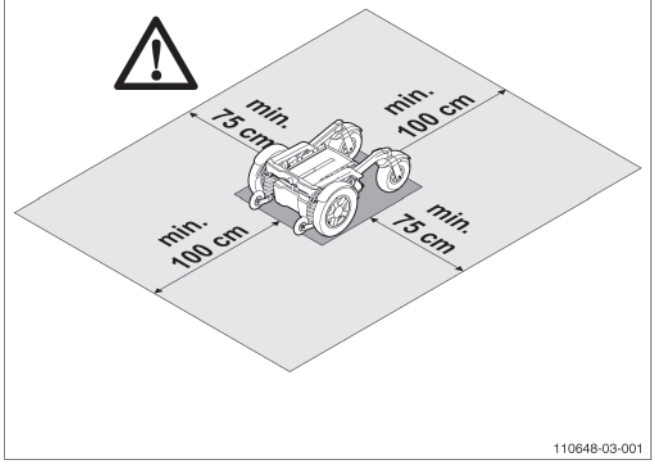
Instructions
- The following operations are required to replace the castor wheel tyre and/or tube:
- Deflate the tyre (not necessary for replacing the complete castor wheel!).
- Loosen the shaft and locking nut. (See instruction: Replacing the castor wheel)
- Hold the wheel tight and remove the shaft.
- Take the castor wheel out of the fork.
- Loosen all Allen bolts and remove the front of the rim half.
- Remove the tyre and the tube, replace a new tube and/ or tyre.
- Replace the tyre and tube on the rim half.
- Mount the front of the rim half and remount the wheel.
- Inflate the tube to the correct pressure. (See: ‘Technical specifications’)

Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.

Tools used
- Lifting device
- Open-ended or ring spanners, 13 mm
- Torque wrench, socket, 13 mm
- Allen key, 5 mm

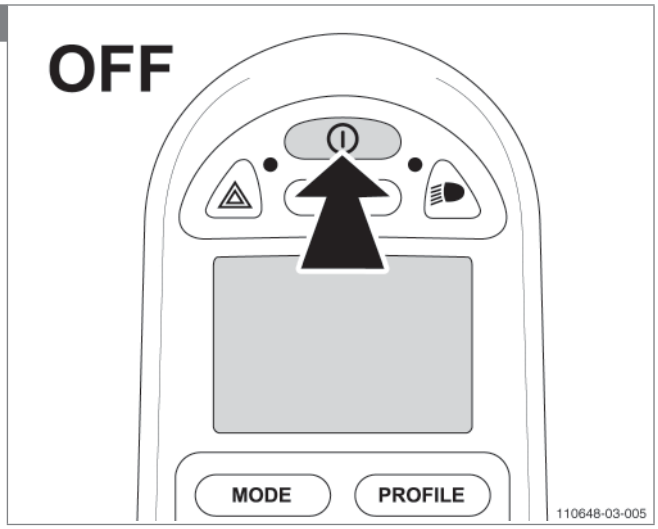
Icons
- ⚠ **Note!** Be aware of the issue!

1



Note! Suitable work area required!

2



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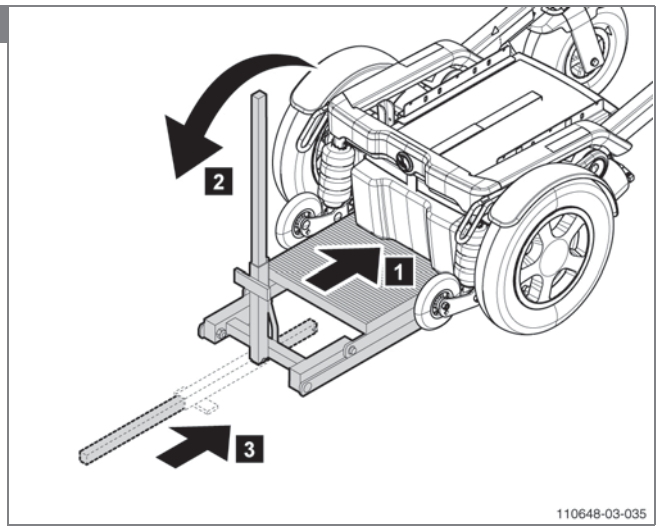

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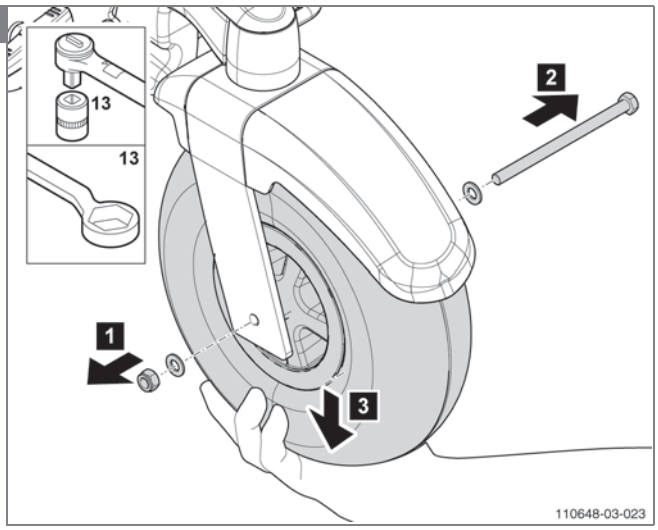

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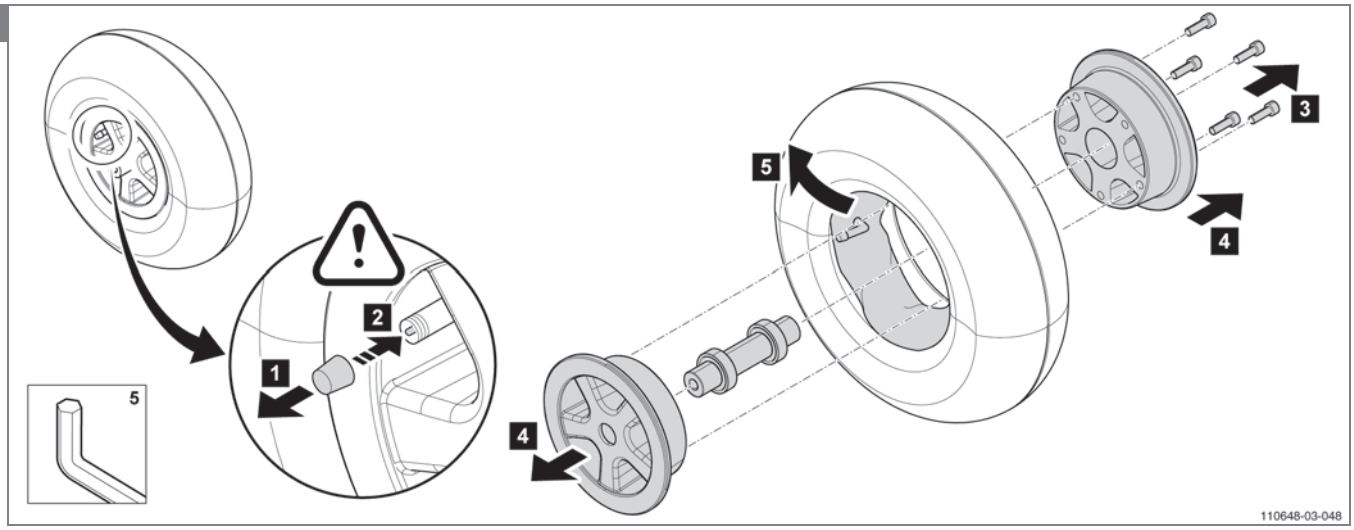
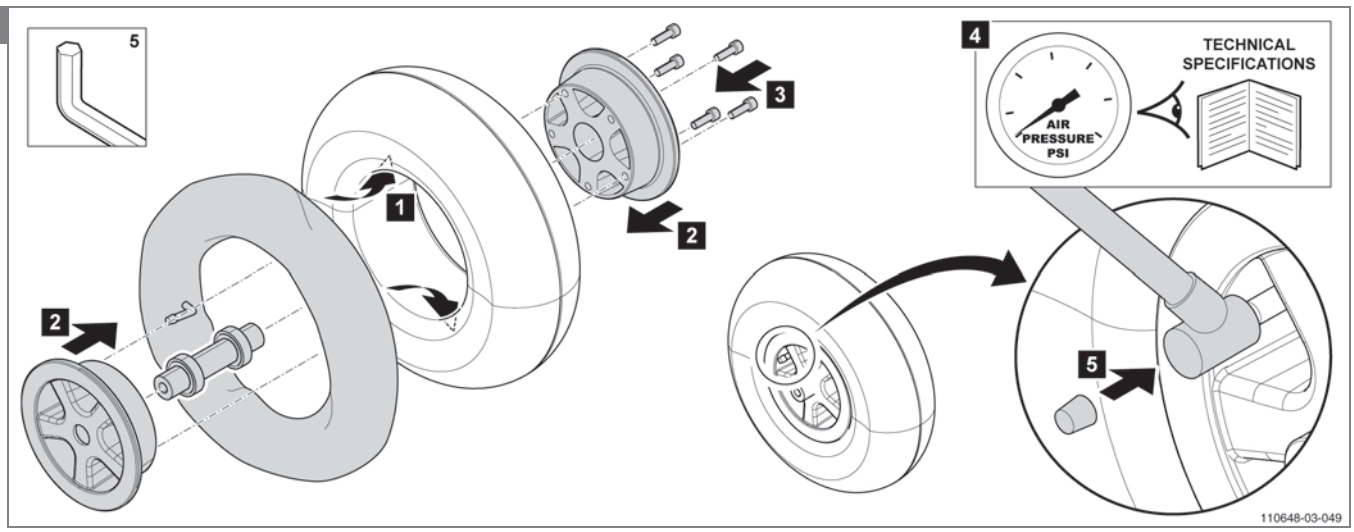


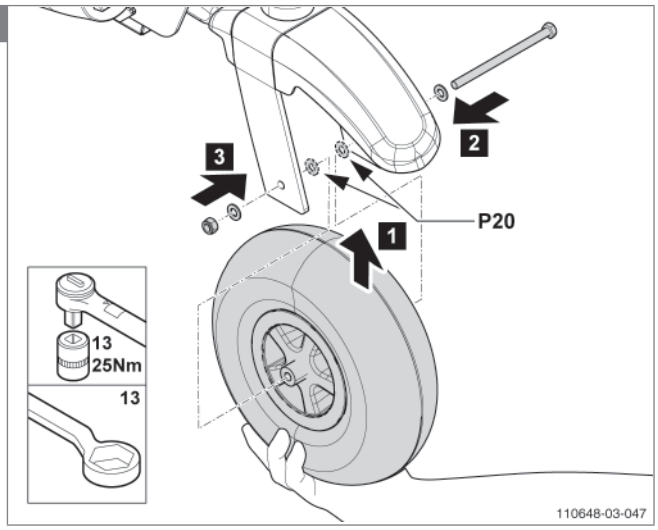
Caution! Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!

6



Caution! Ensure tube and tyre are properly positioned on the rim!
Caution! Make sure the tube is not jammed between the two rim halves!
Note! Inflate the tube to the correct pressure! (See: ‘Technical specifications’)

7



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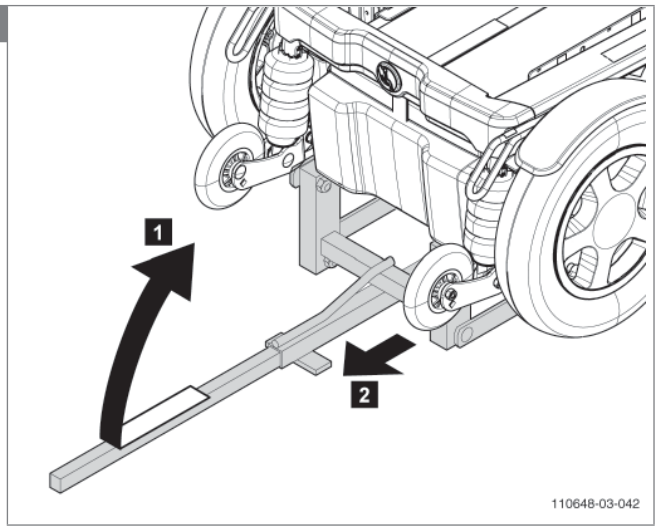


Caution! Deflate the tyre first, before you dismantle the wheel. Follow the steps as shown!

Replacing the castor fork

Preparation
- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive and castor wheels clear of the ground.

Instructions
The following operations are required to replace the castor fork:
- Remove the castor wheel. (See instruction: Replacing the castor wheel)
- Remove the ball head cover and loosen the bolt, washers and shaft that hold the castor fork in the castor arm.
- Take the castor fork out of the castor arm.
- Remove the fender from the castor fork (only Puma 40).
- Replace the fender on the new castor fork.
- Mount the castor fork and wheel in the reverse order.

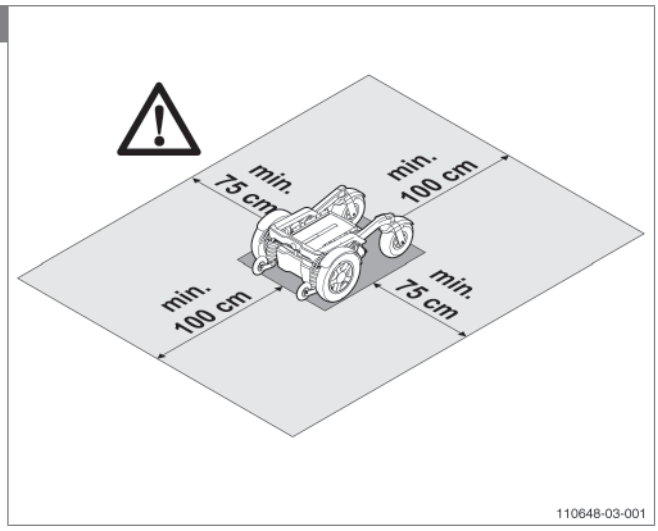
Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.

Relevant article numbers
- 9005932 Castor fork

Tools used
- Lifting device
- Torque wrench, socket, 13 mm
- Torque wrench, Torx key T30
- Circlip pliers
- Loctite 243

Icons
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

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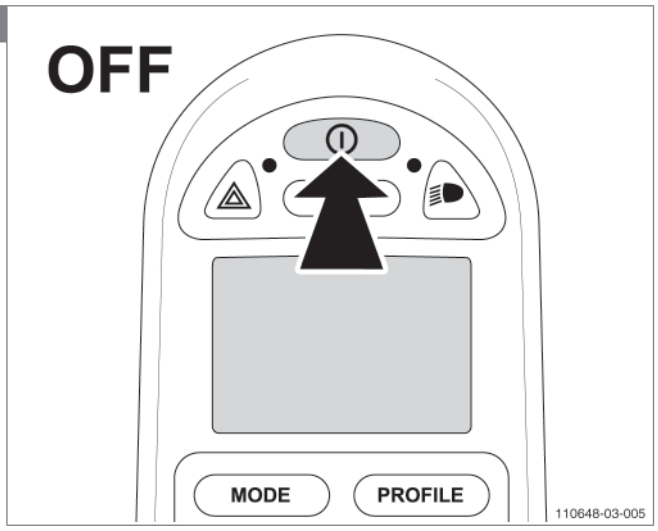

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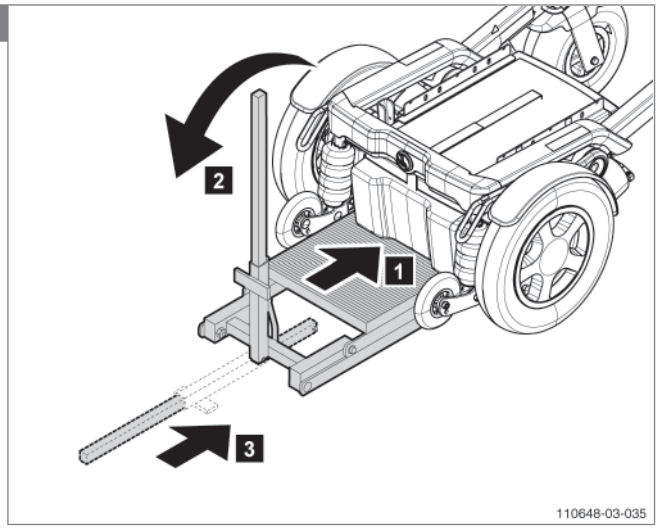

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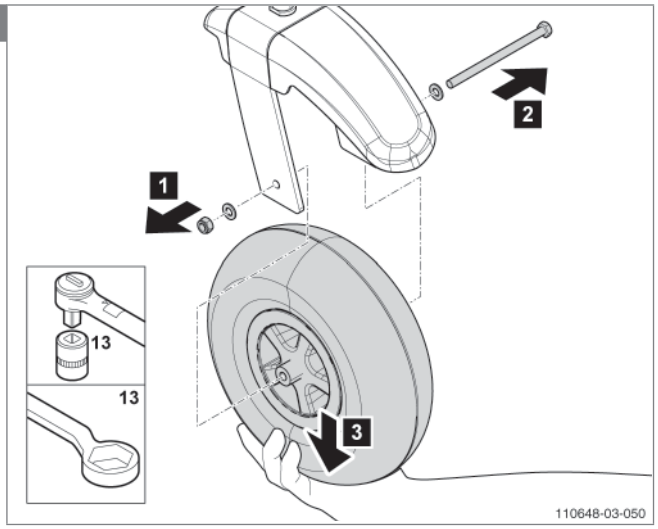

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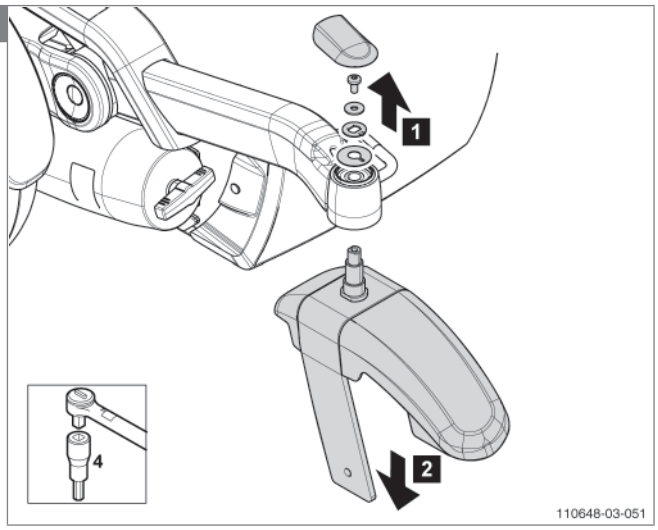

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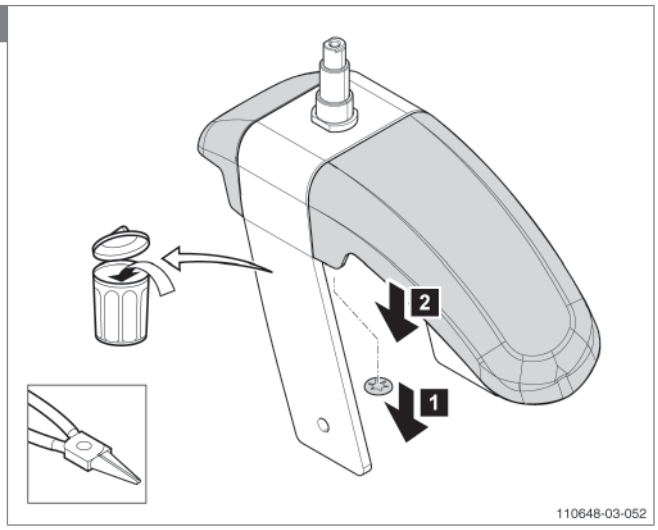

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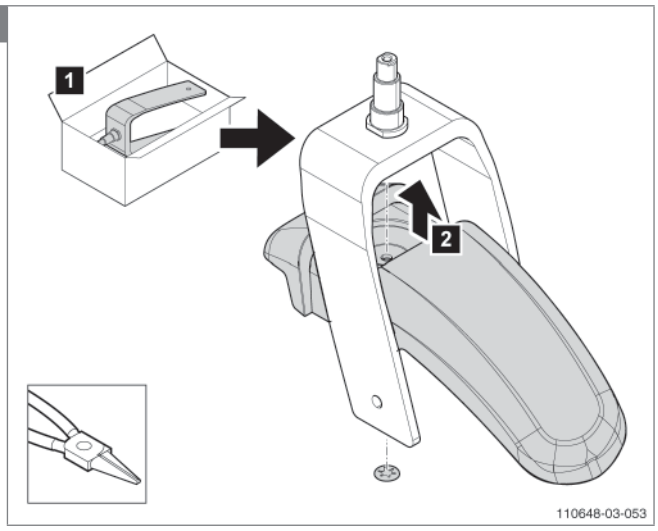

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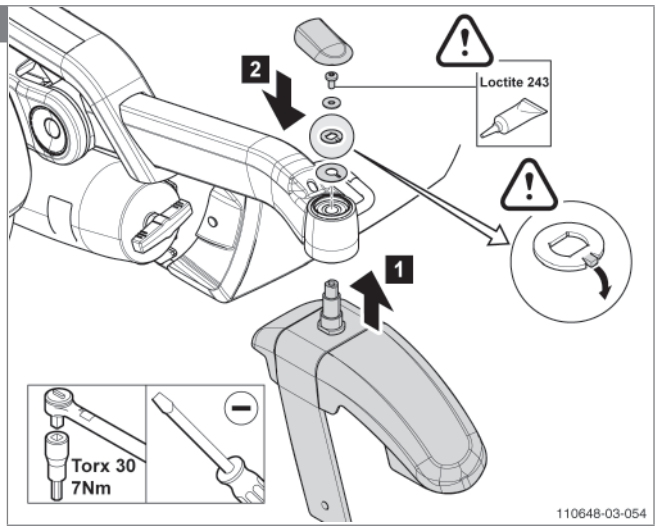
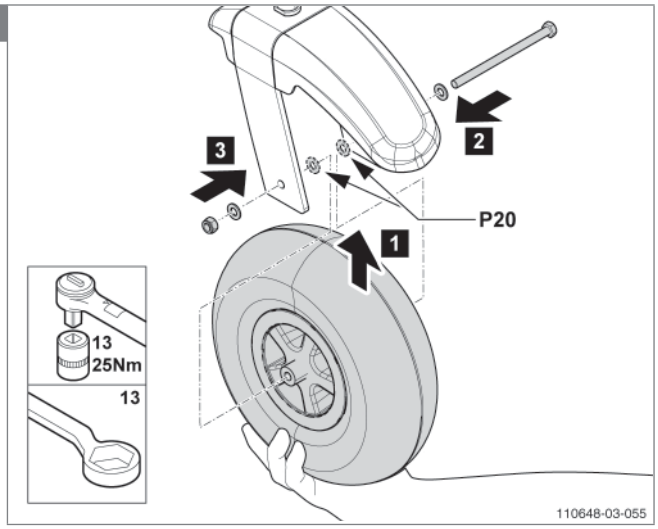


Caution! Apply Loctite 243 to the bolt of the castor fork!
Note! Tighten the bolt of the castor fork with 7 Nm!

9



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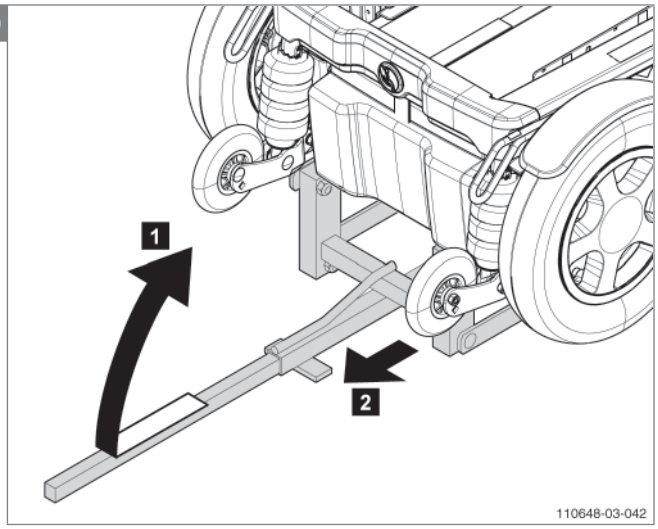


Note! Tighten the shaft and nut of the castor wheels with 25 Nm!
Caution! Place at the Puma 20 on both sides of the castor wheel an extra ring between the wheel and the fork!

5.2.4 Replacements

Replacing the batteries

Preparation
- Switch off the wheelchair via the remote control.
- Remove the fuses from the battery compartment before carrying out any work on the electrical system.

Instructions
The following operations are required to replace the batteries:
- Remove the leg rests and the chair.
- Remove the battery access cover, the battery-guard and the battery strap rear.
- Remove the power module cover and disconnect all connections from the power module.
- Release the battery strap from the battery-guard and slide the battery-guard out of the battery box.
- Release the battery tray by tilting the battery-guard.
- Release the battery strap top and remove the batteries from the battery tray.
- Disconnect all connections from the batteries.
- Replace the new batteries in reverse order.

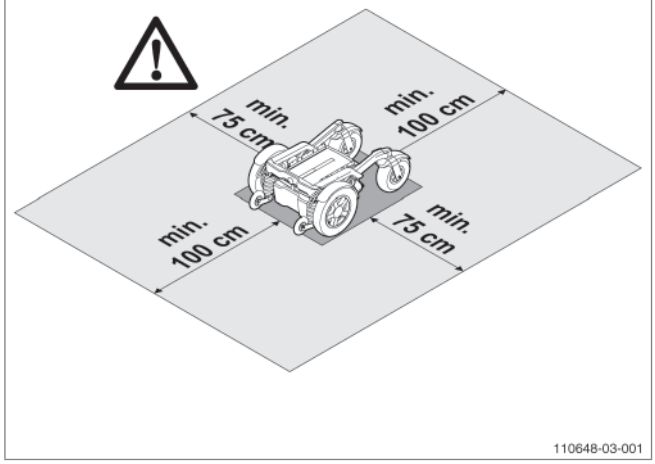
Info
- Some parts need to be replaced; this is indicated by a symbol;
- Contact your supplier, who will advise about disposing the batteries as required.
- Avoid damage to the batteries when replacing them; this may cause the batteries to leak.

Relevant article numbers
- 9002592 M8x12 CKS BZK PRECOTE 85
- 00000.2003 Locking ring, flat M8
- 9002731 Battery MK M40-12 Gel (40Ah C20)
- 9006051 Battery MK M50 AGM (50Ah C20)
- 9002732 Battery MK M34-12 Gel (60Ah C20)
- 1001453 Battery MK M24-12 Gel (74Ah C20)
- 9005956 Battery spacer set universal
- 9005957 Battery spacer set MK (40/50A)
- 9005958 Battery spacer set MK (60/74A)
- 9005959 Battery spacer set Sonnenschein

Tools used
- Torque wrench, socket, 10 mm

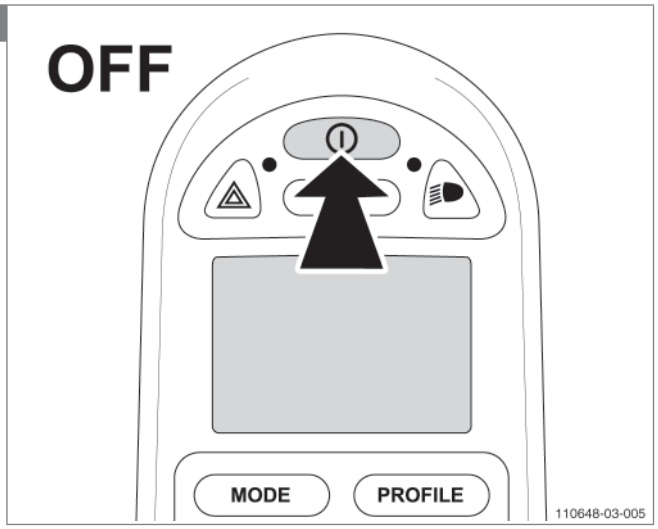
Icons
- Dispose of waste parts in accordance with local regulations.
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

2



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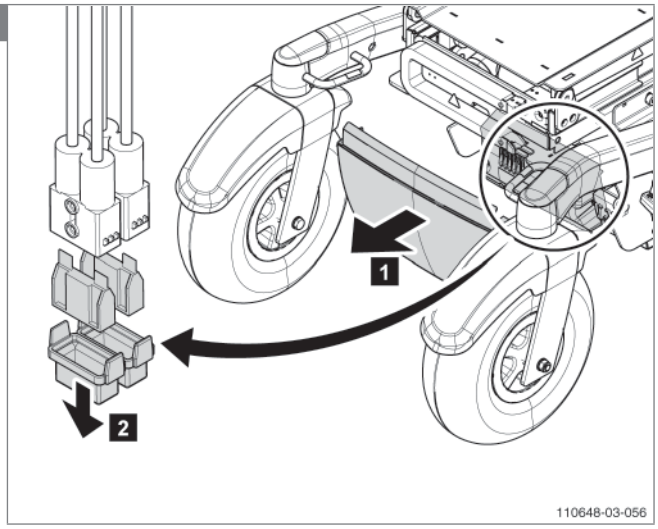

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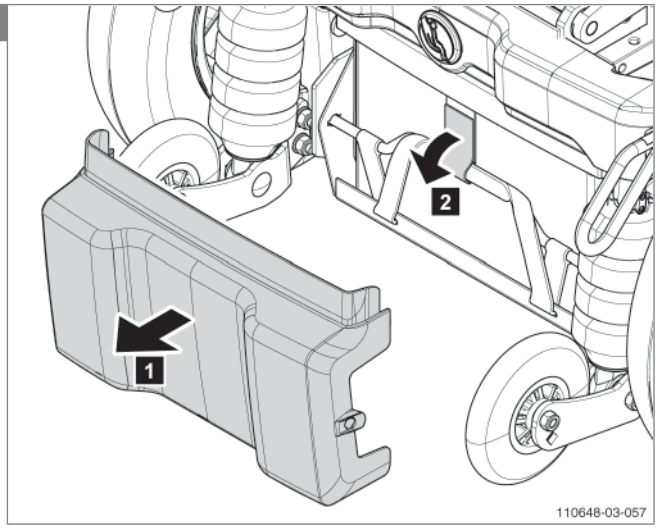

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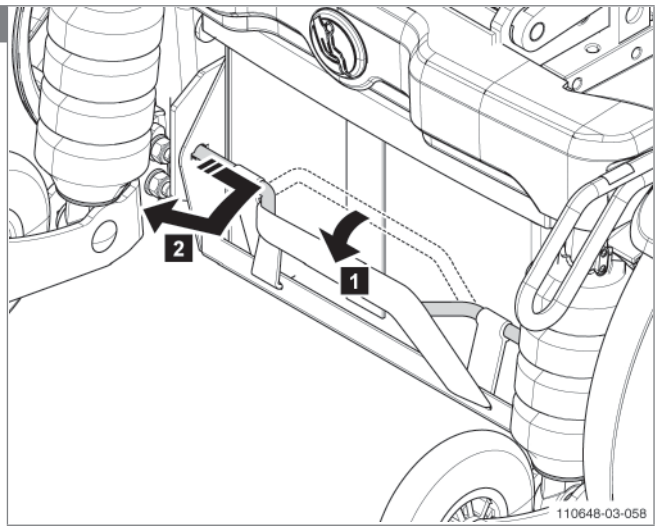

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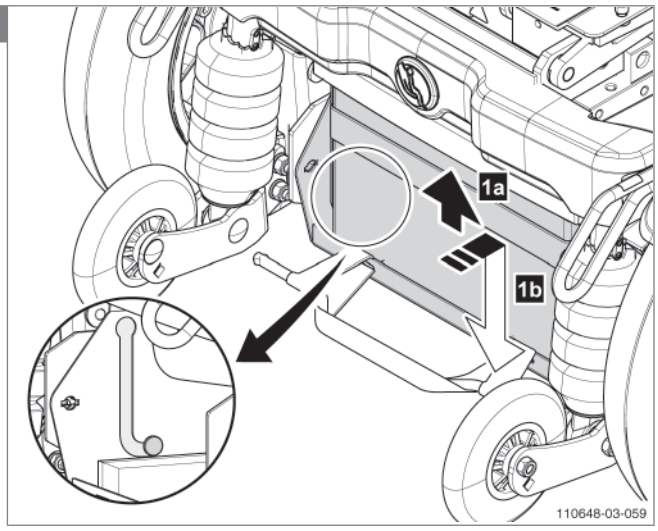
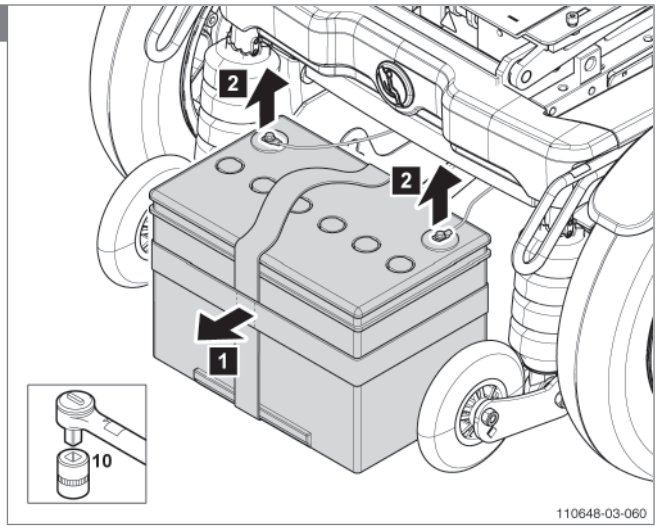


Caution! A battery tray with batteries is a heavy load! Be careful at the moment you undock the battery tray from the battery box!
Caution! Undock the battery tray slowly from projection in the battery box!

7



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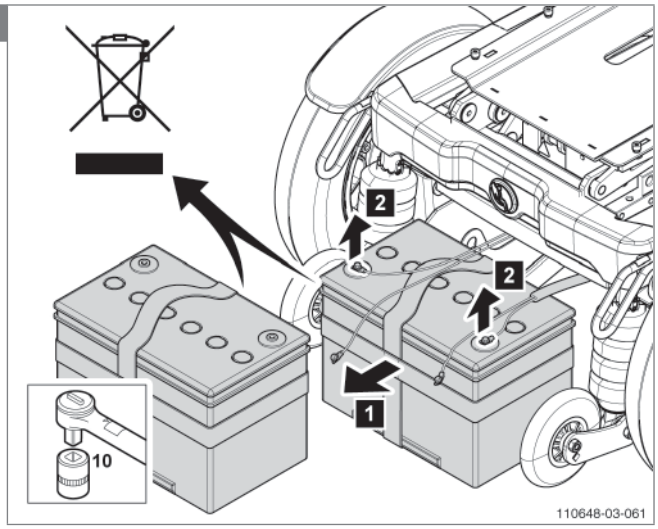
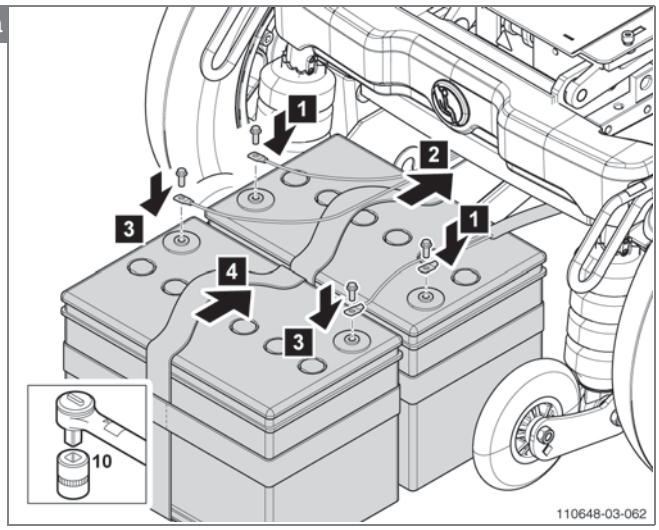


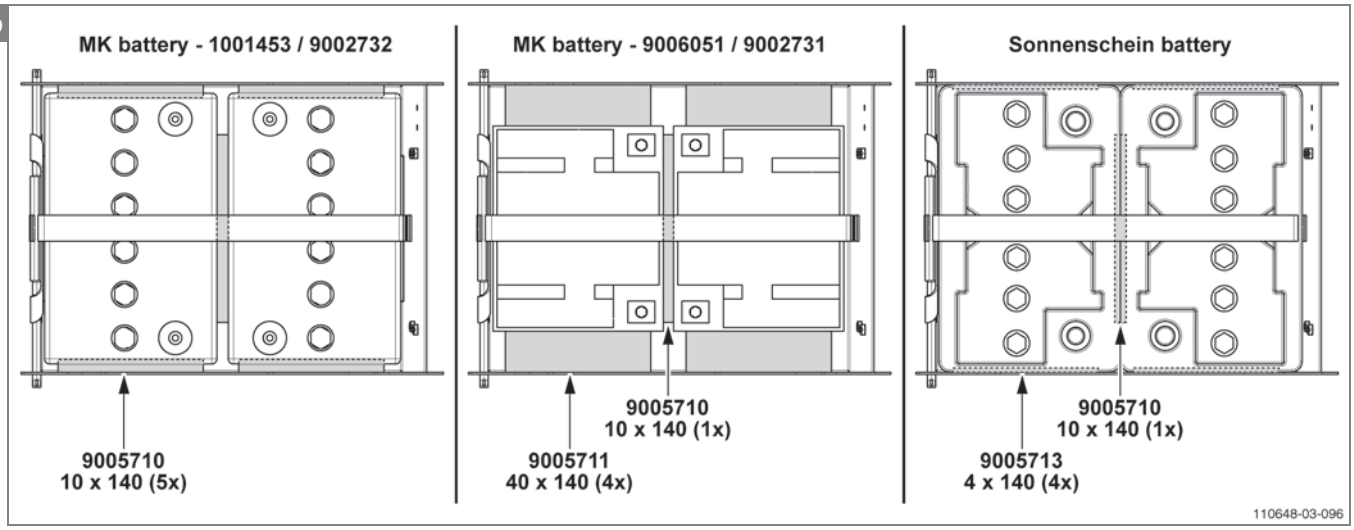
Caution! Dispose of the batteries has to be done in accordance with local regulations!

9a



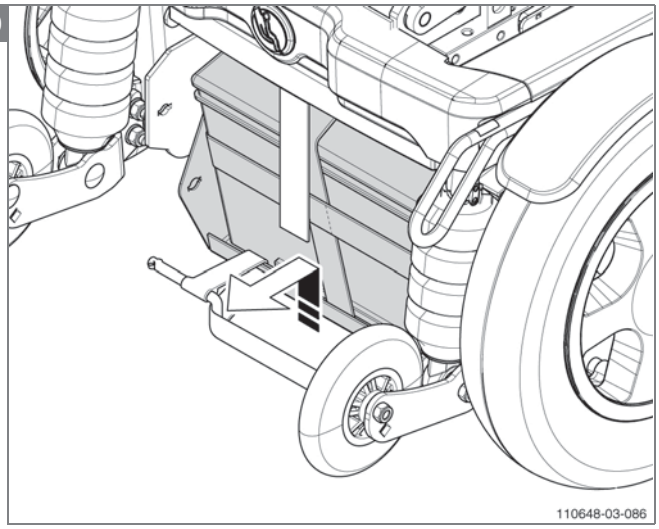
Note! Insert the battery spacer set correctly, as shown in the next diagrams!

9b



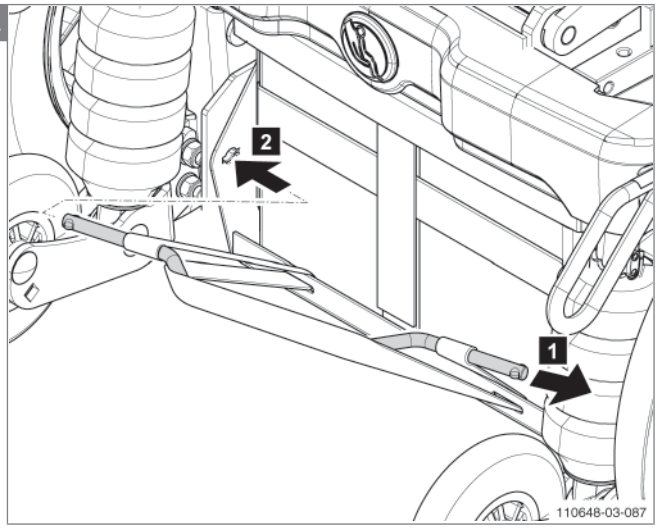
Note! Insert the battery spacer set correctly, as shown in the next diagrams!

10



Caution! Dock the battery tray slowly on the projection in the battery box!

11



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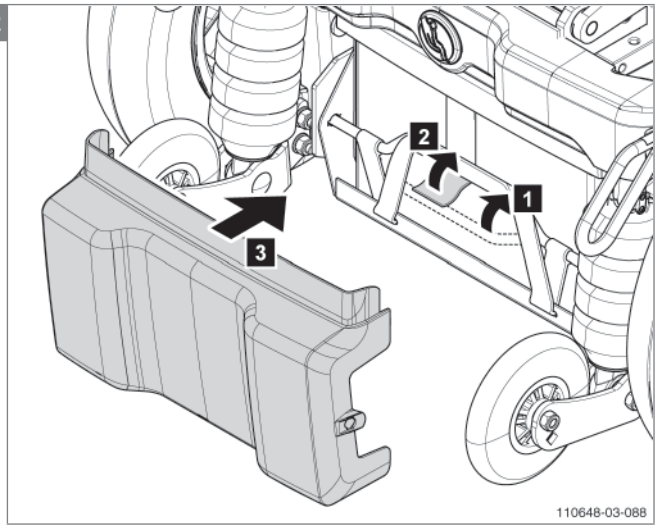


Replacing the power module

Preparation
- Switch off the wheelchair via the remote control.
- Remove the fuses from the battery compartment before carrying out any work on the electrical system.
- Use a lifting device to raise the drive wheels clear of the ground.

Instructions
The following operations are required to replace the power module:
- Remove the power module cover.
- Disconnect all connections of the power module and the battery fuses.
- Unscrew both screws and washers from the battery box.
- Remove the old power module, replace the new power module in the reverse order.

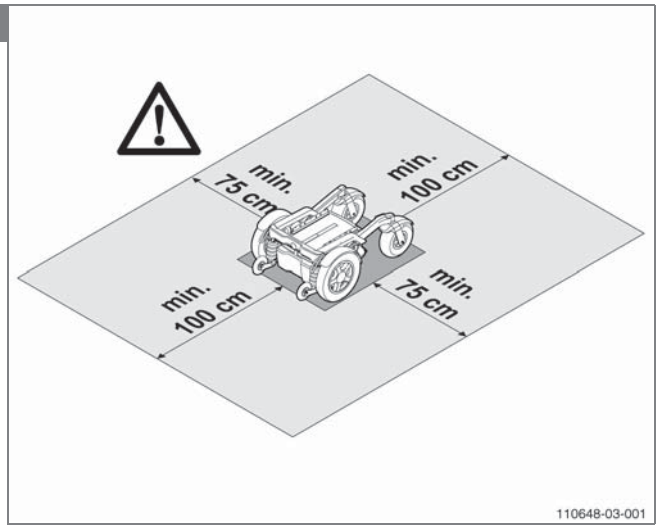
Info
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.
- Some parts need to be replaced; this is indicated by a symbol.
- Always remove the fuses from the battery compartment before carrying out any work on the electrical system!

Relevant article numbers
- 1001180 Power module Shark 75A (DK-PMA01)
- 1003092 Power module Shark 75A (DK-PMB31)
- 1002994 Power module Shark 75A (DK-PMB21)
- 9002464 Power module R-net 90A
- 9002463 Power module R-net 120A
- 9005868 Power module DX2 90A
- 9005869 Power module DX2 70A
- 9002474 Power module VR-2 90A
- 1008388 Power module VR-2 90A twin actuators

Tools used
- Lifting device
- Allen key 4 mm

Icons
- Dispose of waste parts in accordance with local regulations.

1



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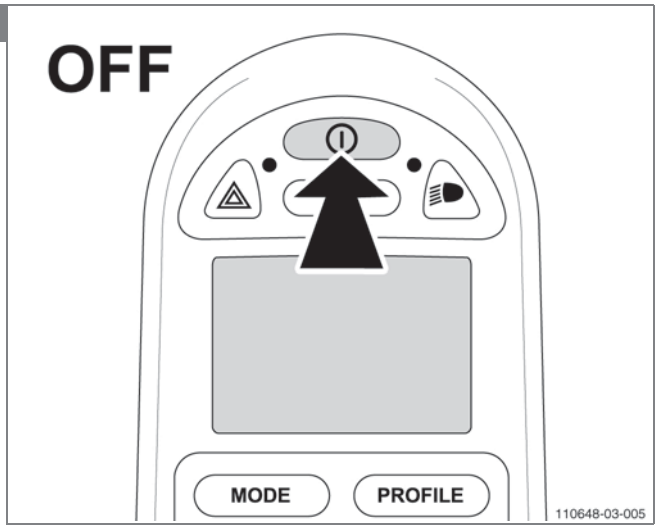
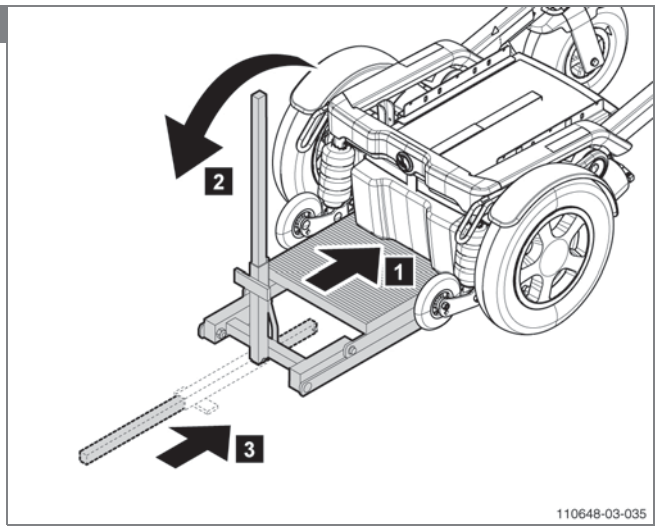


Note! Suitable work area required!

3



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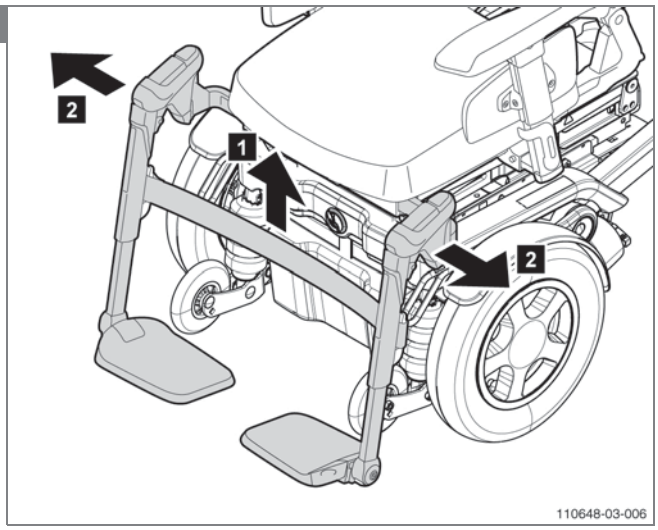

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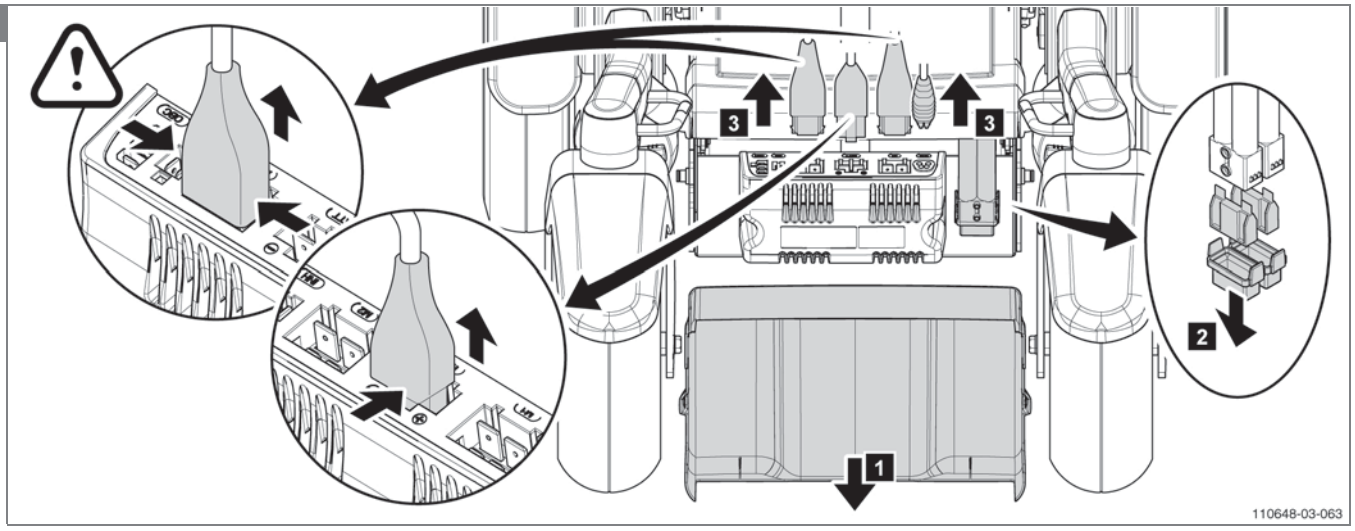

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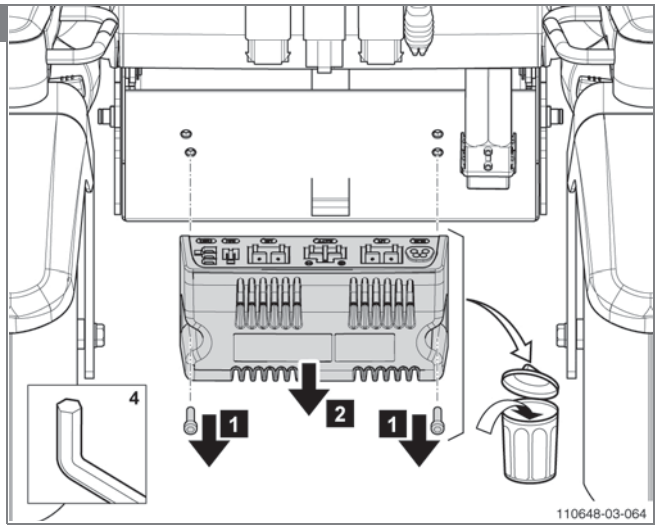

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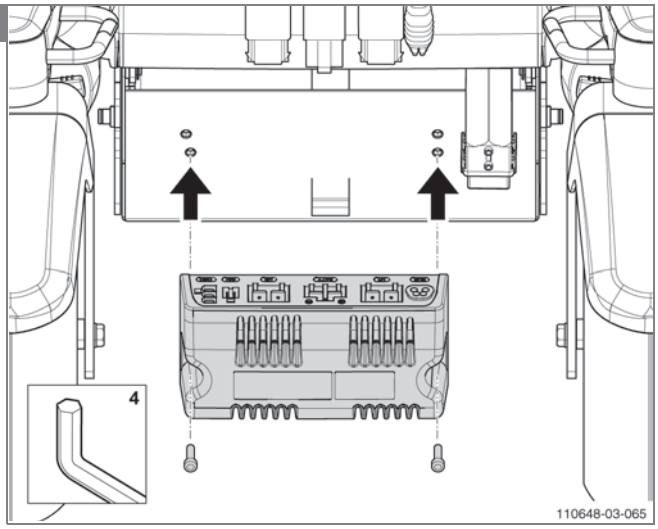
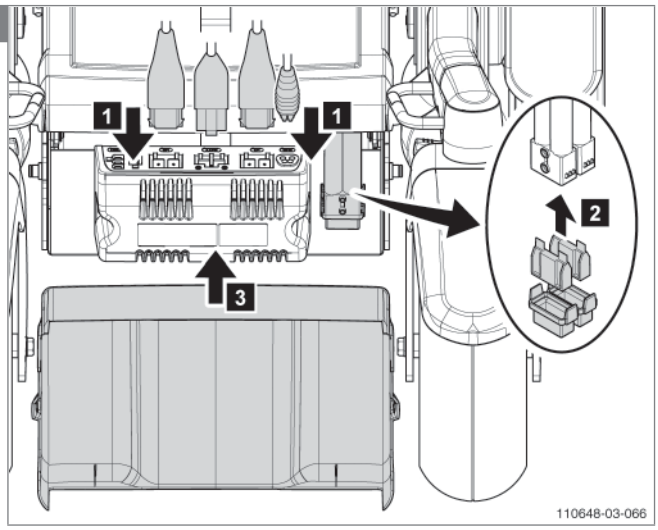


Caution! Dispose of the power module has to be done in accordance with local regulations!

8



Replacing the mudguards (only Puma 40)

Preparation
- Switch off the wheelchair via the remote control.
- Use a lifting device to raise the drive wheels clear of the ground.

Instructions
The following operations are required to replace the mudguards, with or without brackets.
With brackets:
- Turn the drive wheel in the correct position.
- Loosen (through the rim) the 2 bolts of the mudguard brackets on the motor arm.
- Remove the mudguards with brackets.
- Tighten the new mudguard with brackets on the motor arm.

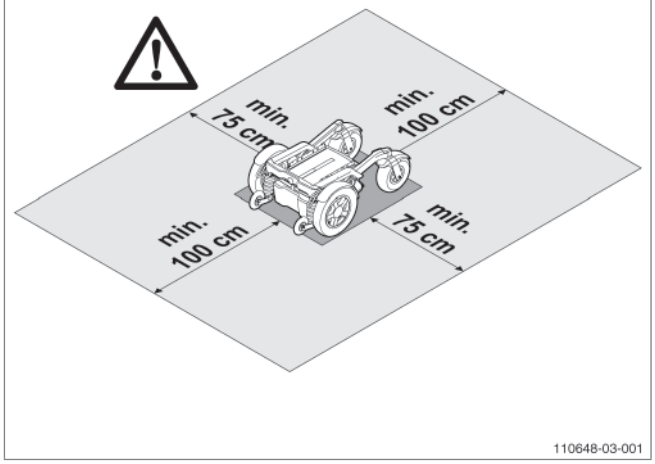
Notice
- N.a.

Relevant article numbers
- 9004533 Drive wheel fender black
- 0001.1110 Rivets alu 3,2 x 10
- 9002600 Drive wheel bolt and ring
- 9005978 Drive wheel fender with bracket

Tools used
- Lifting device
- Torx key T30

Icons
- N.a.

1



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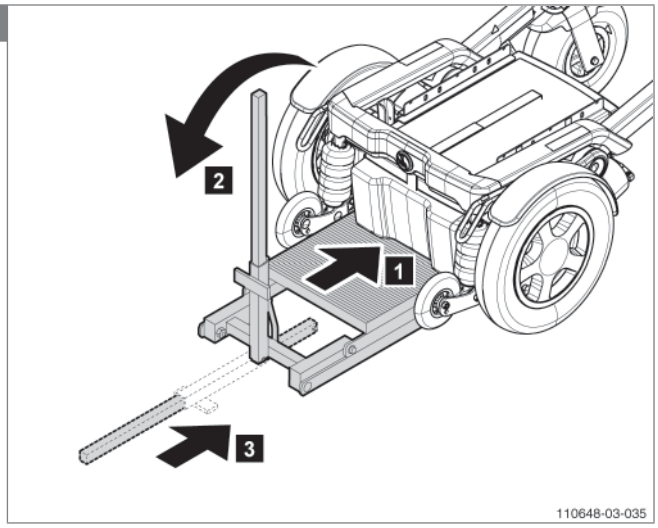
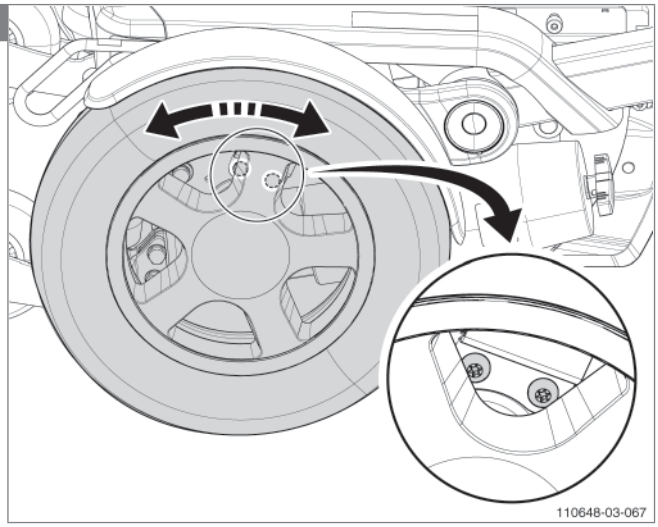


Note! Suitable work area required!

3


110648-03-067

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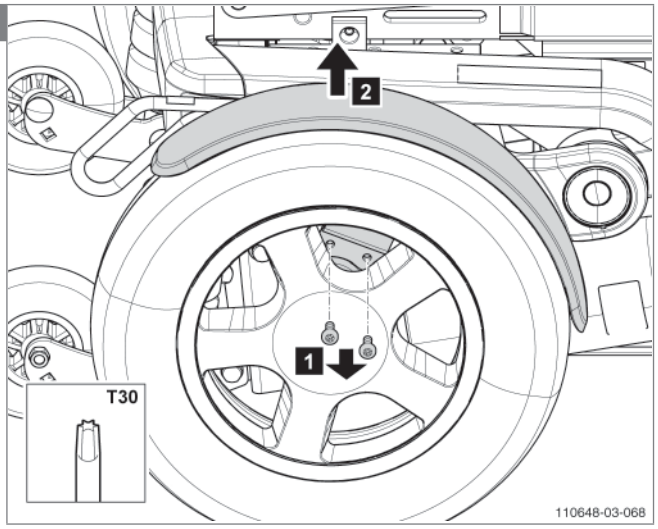
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1
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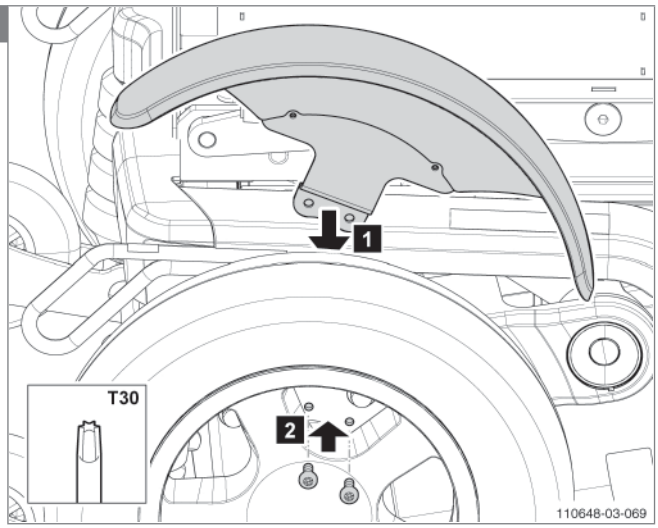
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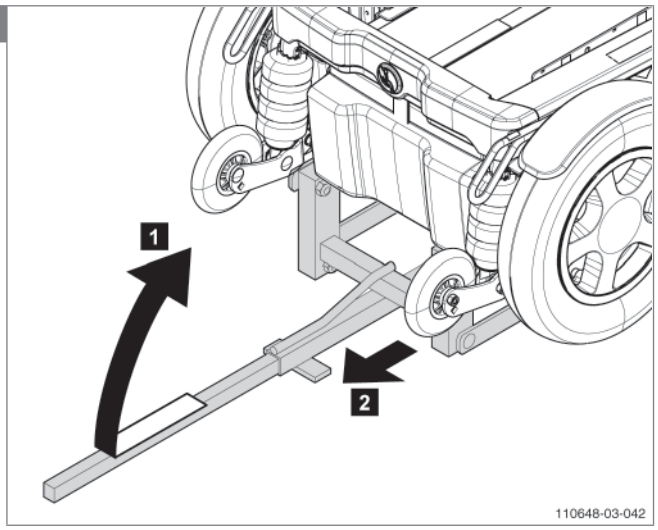

1
2
110648-03-042

Replacing the coloured covers

Ball head cover / Deco ring motor arm / Deco strip suspension bridge cover

Preparation
Switch off the wheelchair via the remote control.

Instructions
The following operations are required to replace the three cover sets.
Ball head cover set:
- Take away the old cover and click back the new cover.

Deco ring motor arm set:
- Take away the old cover and click back the new cover.

Deco strip under the suspension bridge cover:
- Take away the old cover
- Click the new cover with turning movement back under the suspension bridge cover.

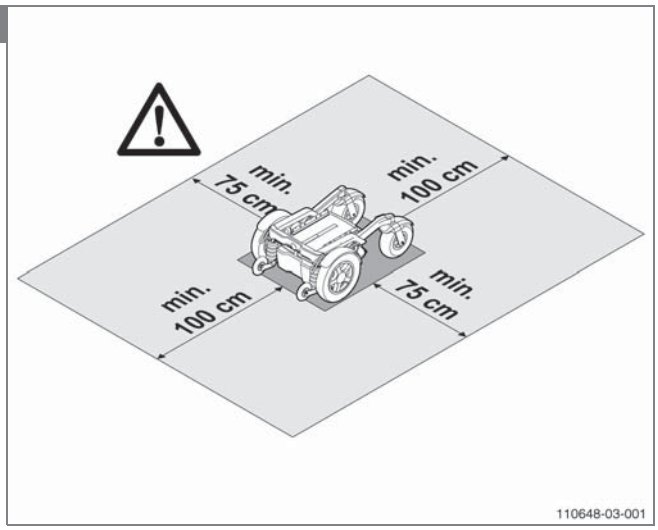
Notice
Use a screwdriver in case you can't get off the covers by hand.

Relevant article numbers
9005982 Deco covers green
9005983 Deco covers blue
9005984 Deco covers orange
9005985 Deco covers silver

Tools used
• Screwdriver

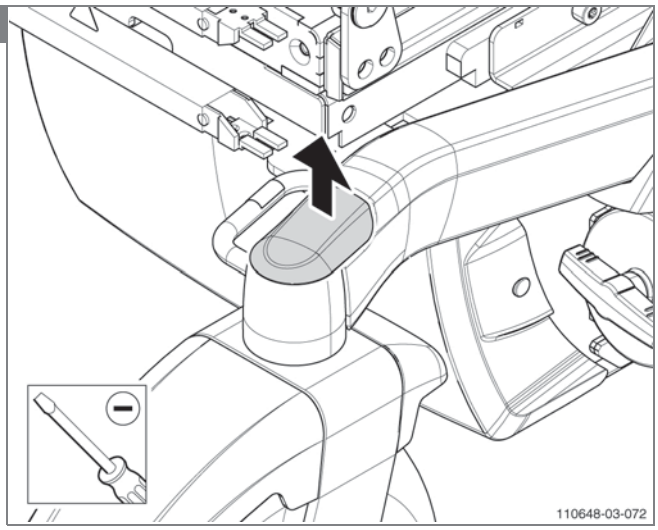
Icons
• N.a.

1



Note! Suitable work area required!

2



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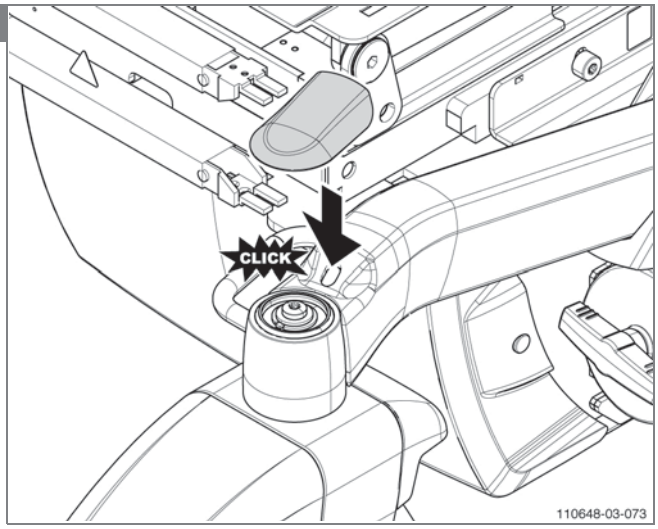

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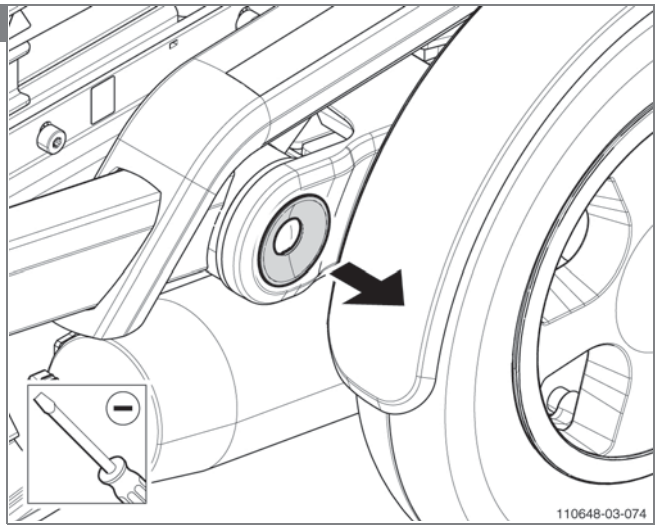

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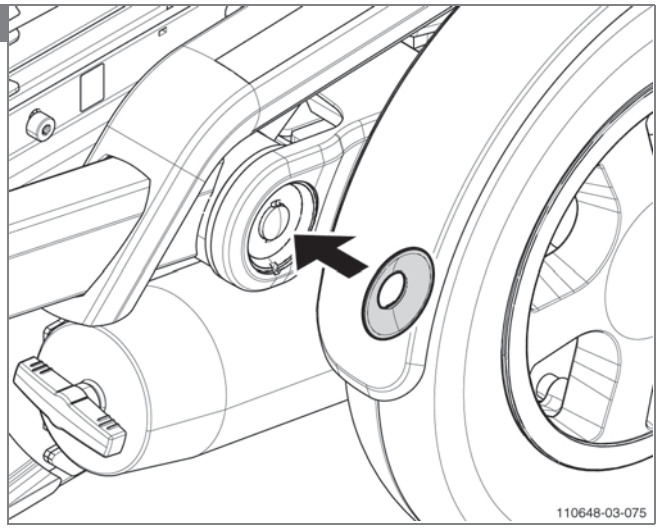

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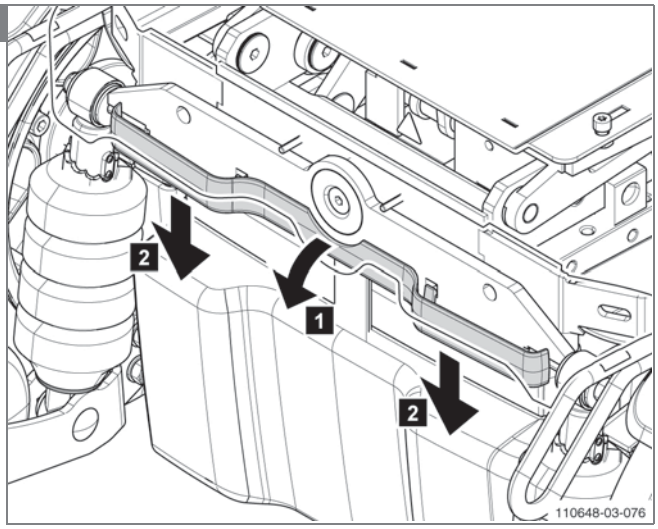

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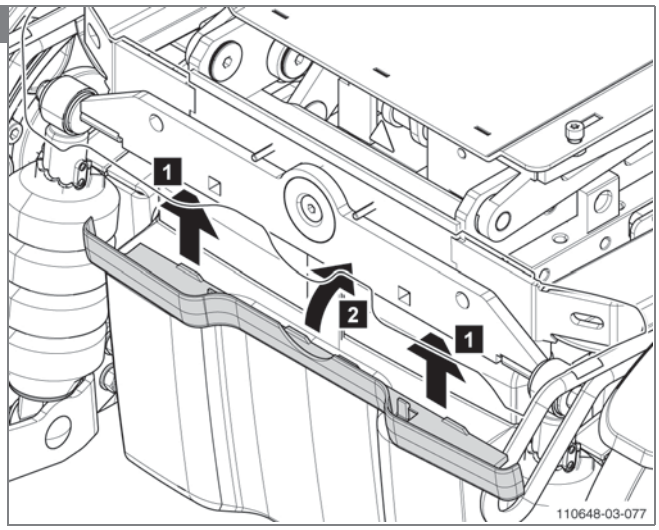


5.2.5 Seat adjustments

Adjusting the seating height

Preparation
- Switch off the wheelchair via the remote control.
- Remove the fuses from the battery compartment before carrying out any work on the electrical system.
- Use a lifting device to raise the drive wheels clear of the ground.

Instructions

The following operations are required to adjust the seat height:
- Switch off the wheelchair via the remote control.
- Remove the leg rests.
- Lift the chair, in case the wheelchair has a lift.
- Disconnect all connections of the power module and the battery fuses.
- Remove the entire seating unit (incl. electrical lift, electrical tilt or mechanical tilt) from the carrier.
- Two people are needed to carry out this operation.
- Loosen the mounting supports (l/r) of the lift supports.
- Adjust the height of lift support; 5 height adjustments are possible (0/+25/+50/+75/+100).
- Is the lift support in the lowest position? Mount also the battery cover in the lowest position!
- Replace the entire seating unit on the carrier. Two people are needed to carry out this operation.
- Tighten the interface and seat on the carrier.
- Replace the leg rests.

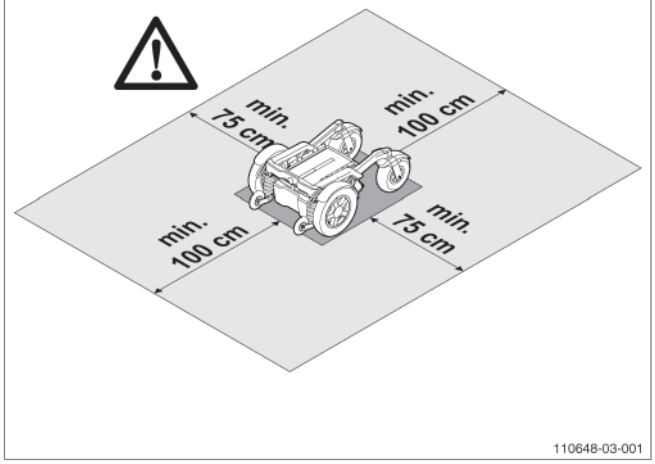
Notice
- Use a lifting device to raise the wheelchair / Puma 20/40 carrier.
- Raising the seat height has a negative effect on dynamic stability, because of the centre of gravity rises. Please read the user manual or contact your supplier, who will advise about the seat adjustments.

Relevant article numbers
- 9002592 M8x12 CKS BZK PRECOTE 85
- 00000.2003 Locking ring, flat M8

Tools used
- Lifting device
- Screwdriver
- Allen key, 6 mm
- Torx key, T30
- Open ended or ring spanner, 10 mm
- Pair of wire-cutters
- Tie wraps

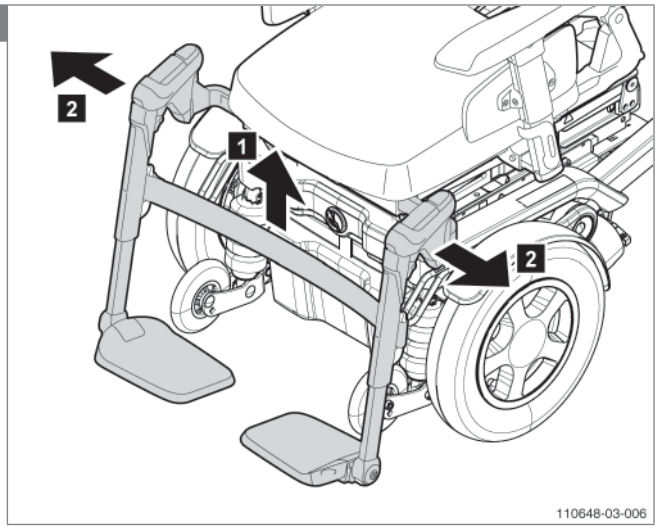
Icons
- Dispose of waste parts in accordance with local regulations.
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

2



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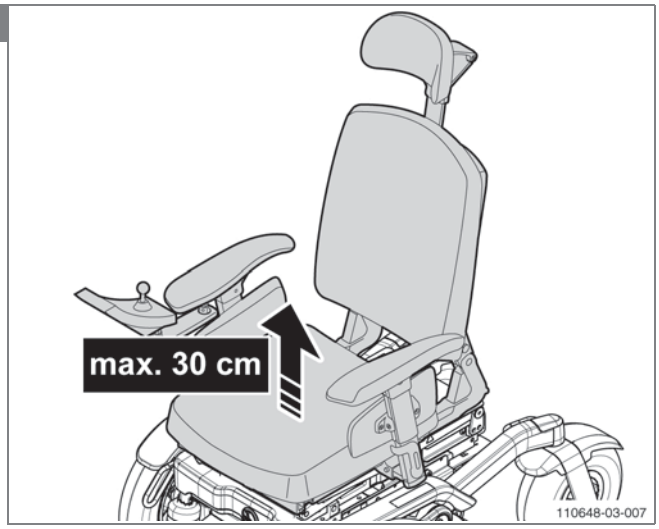

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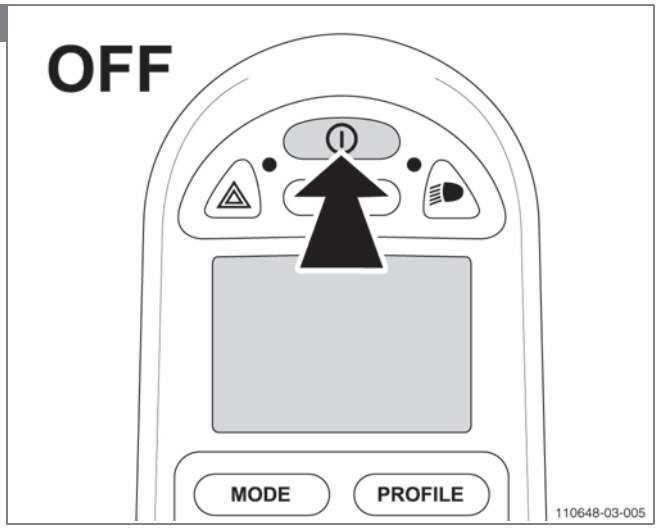
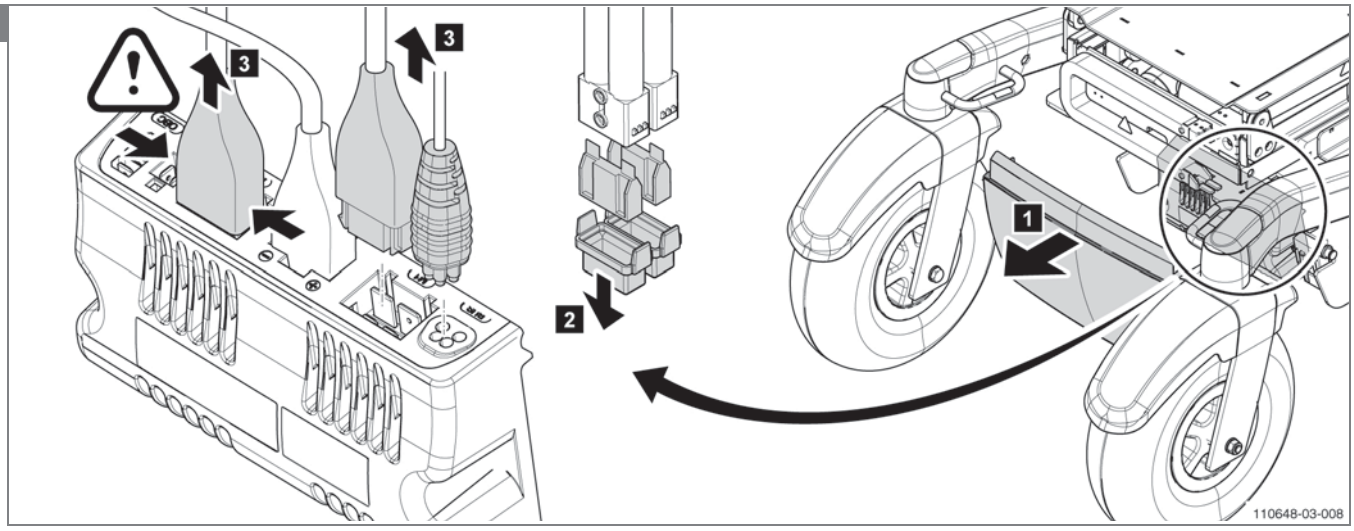


Note! Lift the chair, in case the wheelchair has a lift.

5



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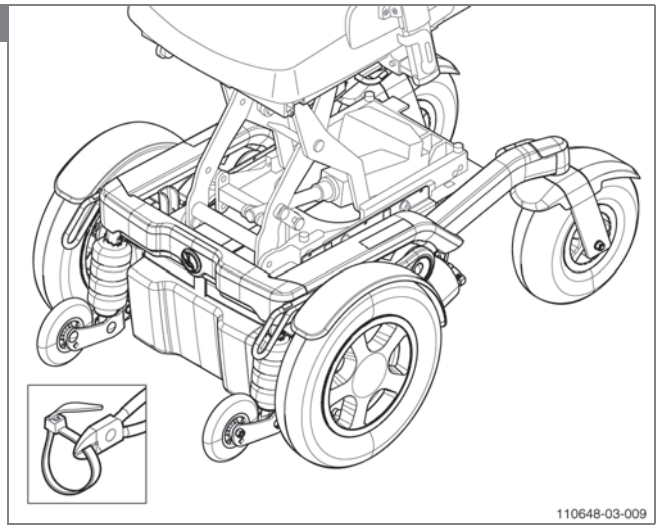

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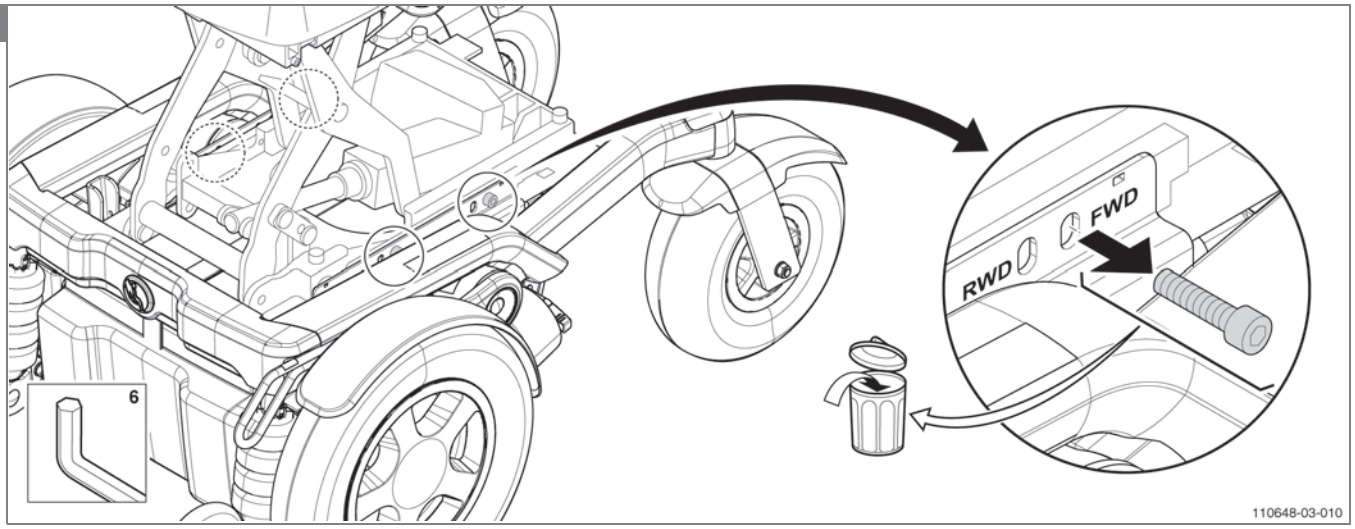
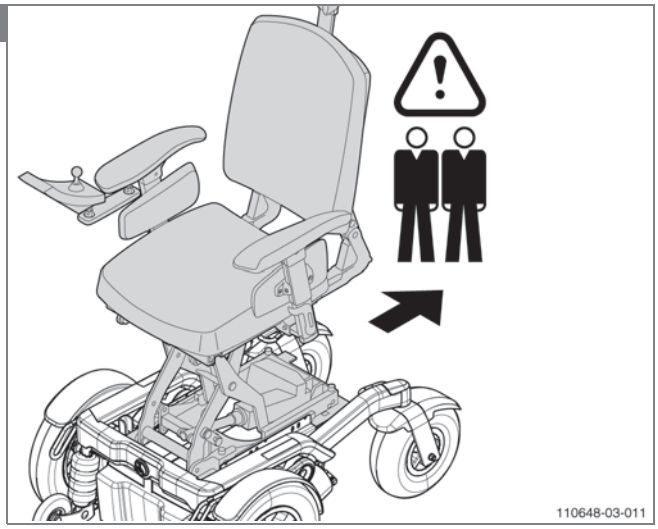


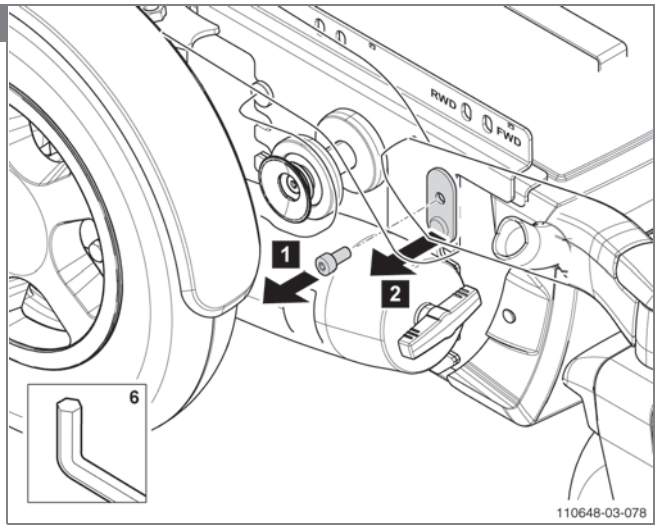
Note! Keep the spacers for reuse for rebuilding the wheelchair.

8



Caution! Two people are needed to carry out this operation.

9



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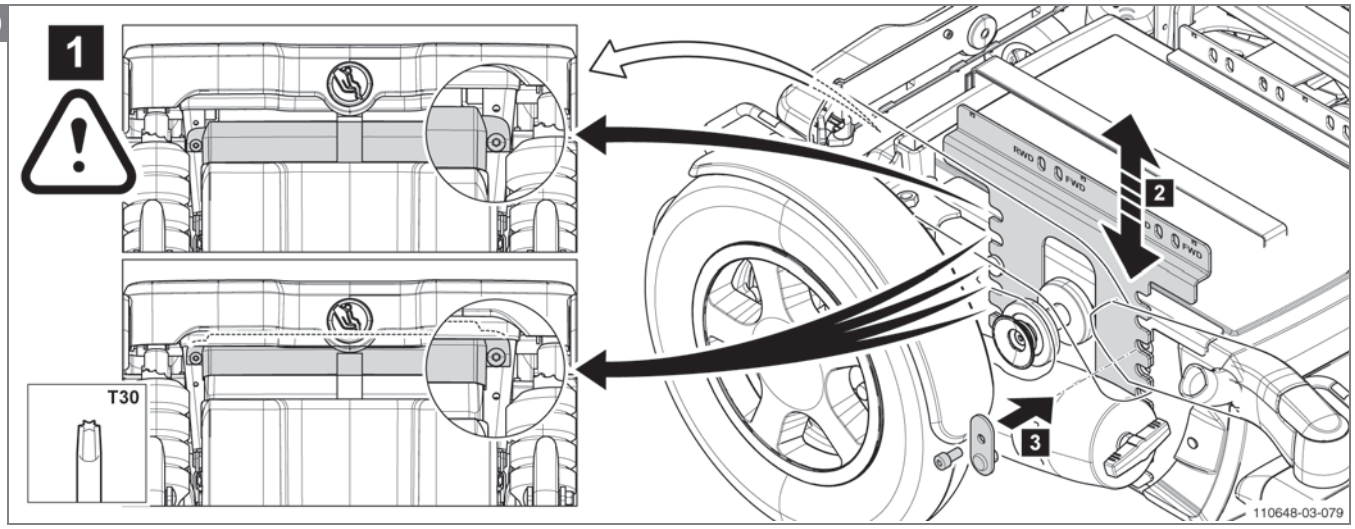

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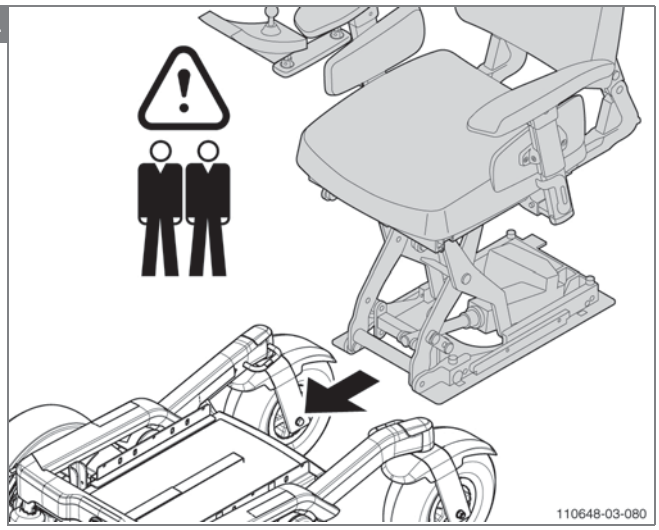
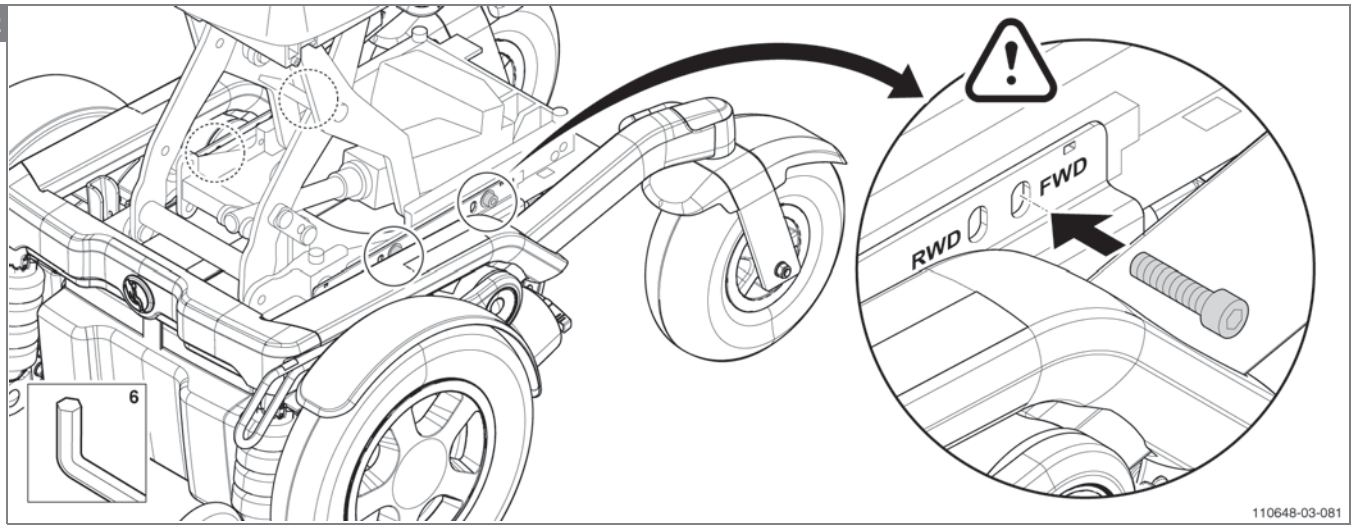


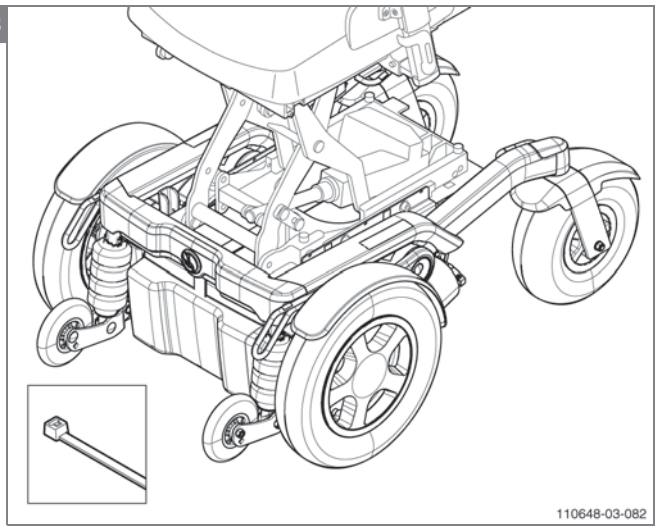
Caution! Two people are needed to carry out this operation.

12



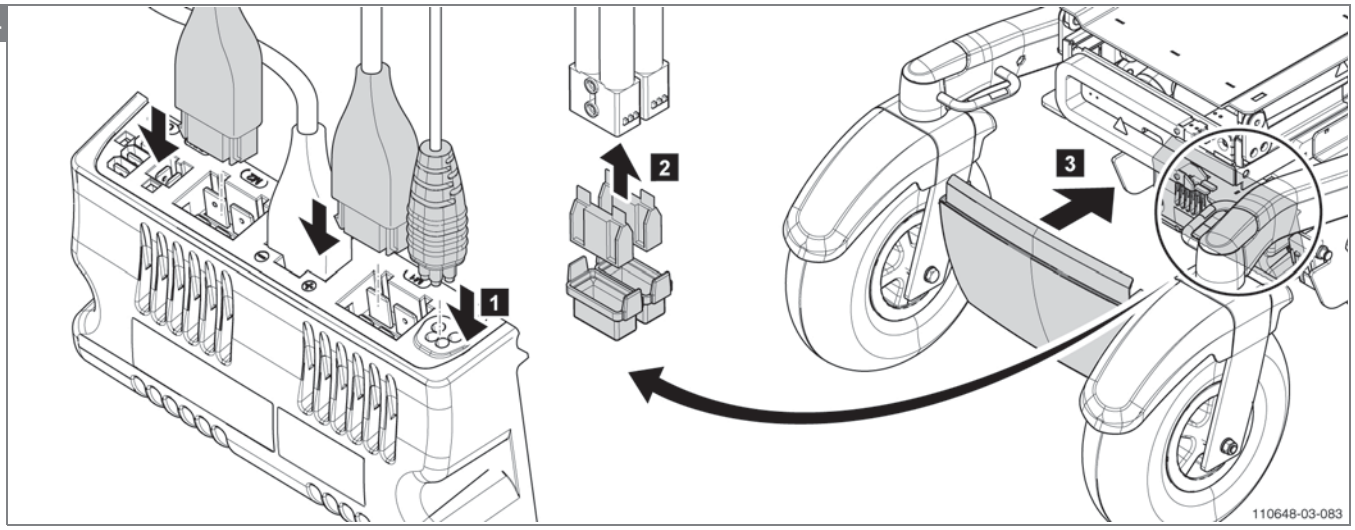
Note! Reuse the spacers.

13



Note! Fasten the cables with tie wraps!

14



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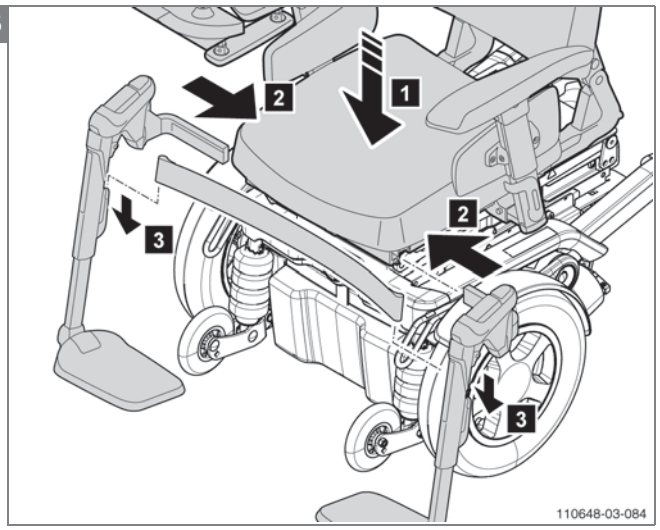


Adjusting the centre point of gravity

Preparation
- Switch off the wheelchair via the remote control.

Instructions
The following operations are required to adjust the centre of gravity:
- Remove the leg rests.
- Loosen the 4 bolts.
- Move the whole chair unit to the correct position.
- Remount the 4 bolts.
- Replace the leg rests.

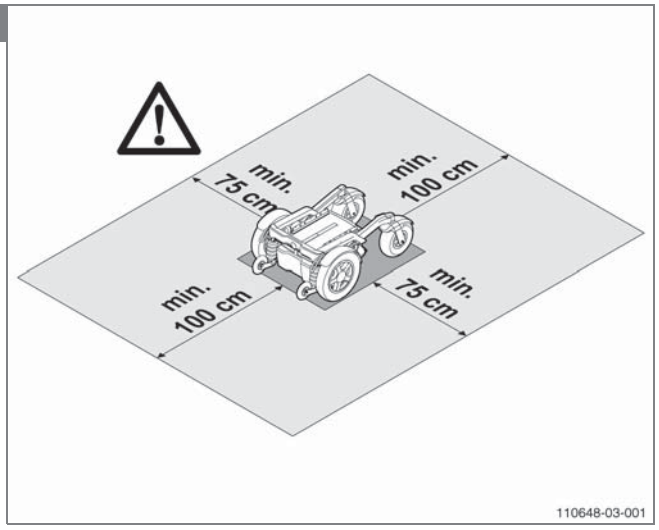
Notice
- Changing the wheelchair's centre of gravity may negatively influence the wheelchair's driving characteristics and/or its dynamic stability!

Relevant article numbers
- 9002592 M8x12 CKS BZK PRECOTE 85
- 00000.2003 Locking ring, flat M8

Tools used
- Allen key, 6 mm

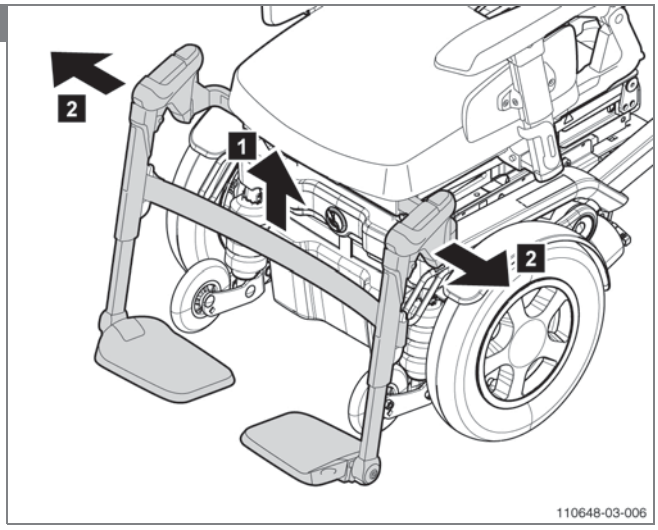
Icons
- Dispose of waste parts in accordance with local regulations.
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

2



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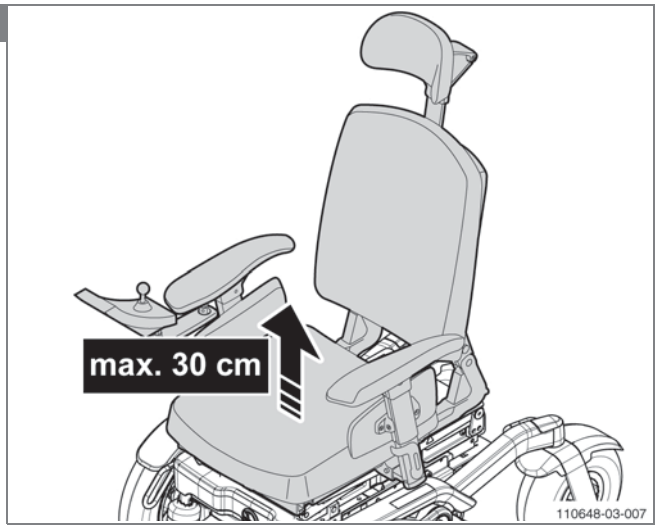
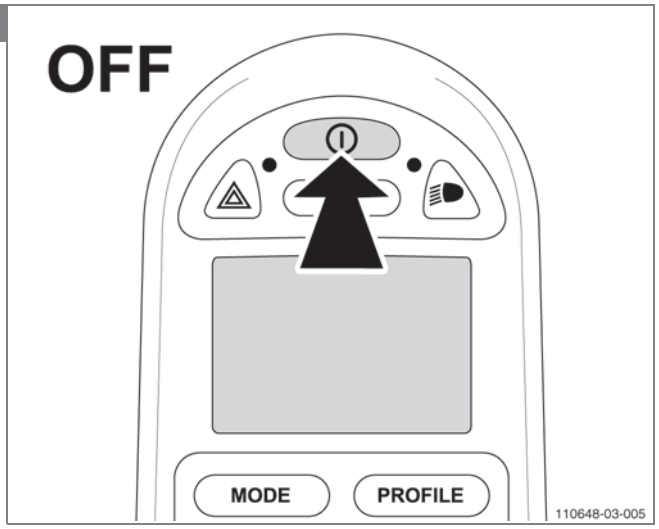


Note! Lift the chair in case the wheel chair has an electrical lift.

4



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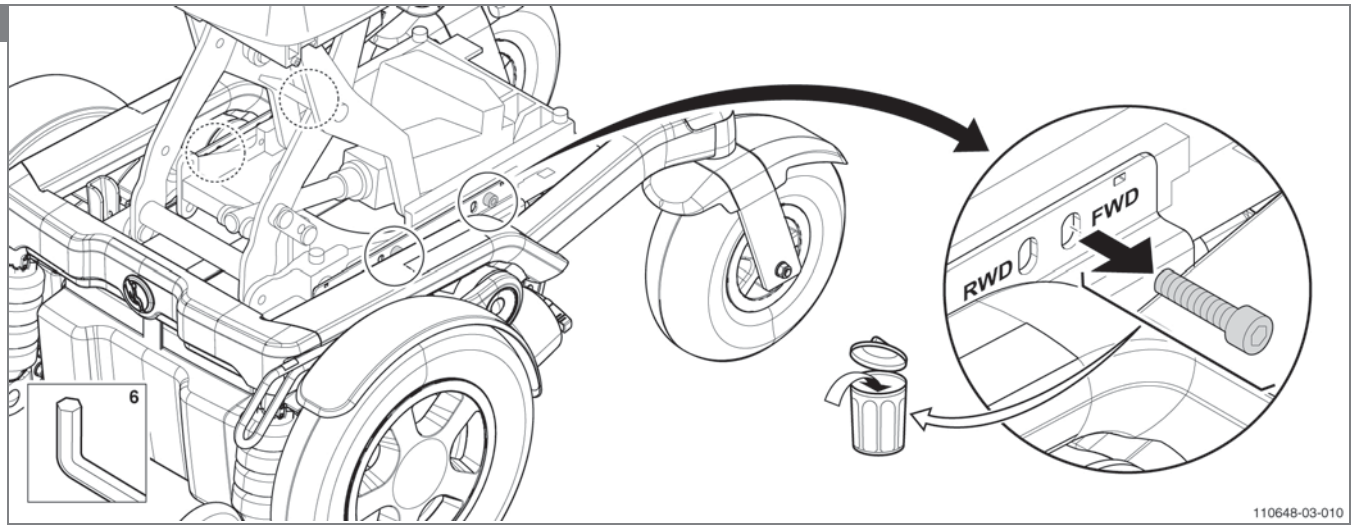

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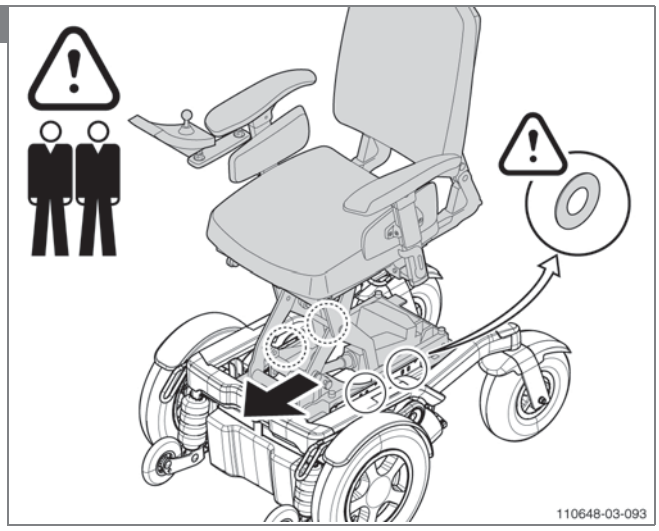

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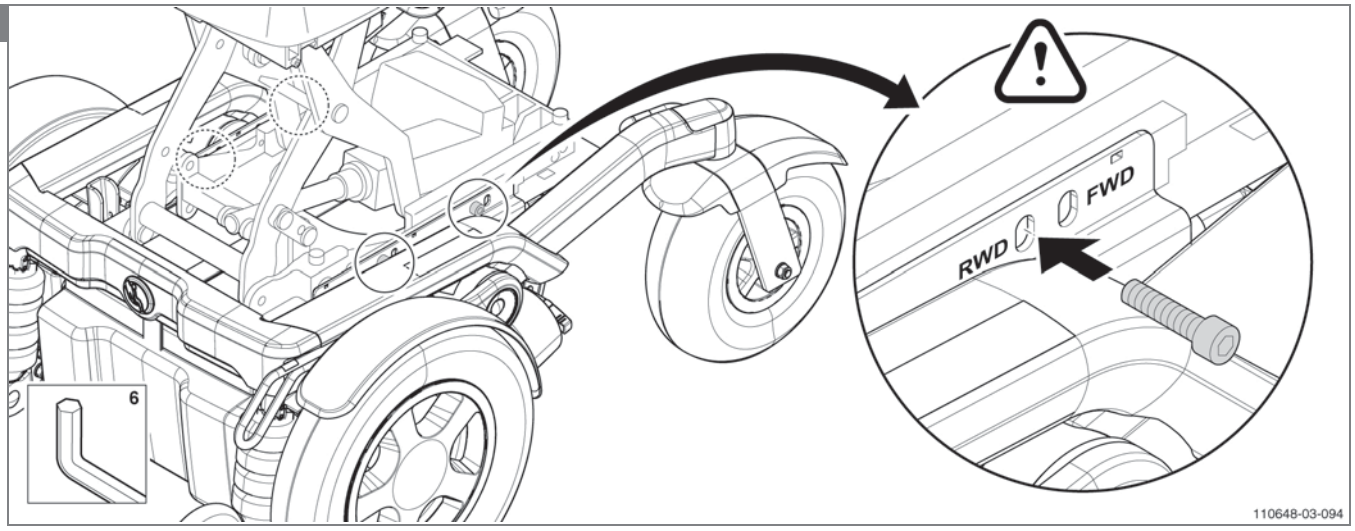

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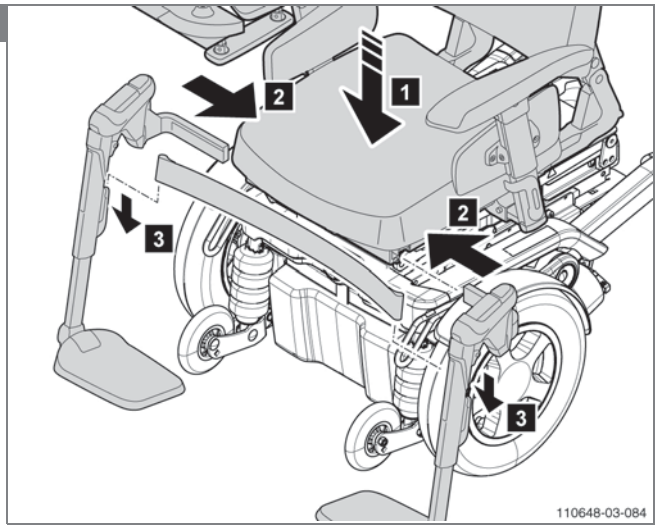


Adjusting the mechanical seat tilt

Preparation
- Switch off the wheelchair via the remote control.

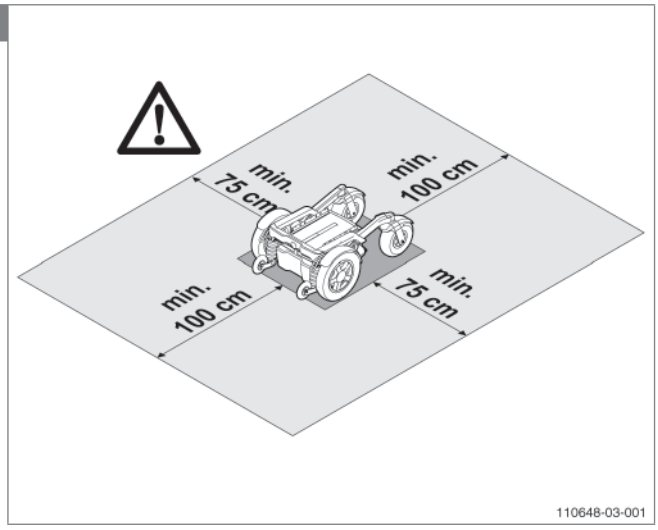
Instructions
The following operations are required to adjust the mechanical seat tilt:
- Remove the entire seating unit from the carrier. Two people are needed to carry out this operation. (See instruction: Converting Puma 20/40 front wheel drive (FWD) to rear wheel drive (RWD), Step 2 Remove interface and seating.)
- Loosen the 2 bolts in the interface frame.
- Move the upper part of the interface in the desired position (two other positions possible!).
- Tighten the 2 bolts.
- Replace the seat on the interface.

Notice
- Changing the wheelchair's tilt position from 20º to 25º may negatively influence the wheelchair's driving characteristics.

Tools used
- Torque wrench, socket, 13 mm
- Allen key, 6 mm

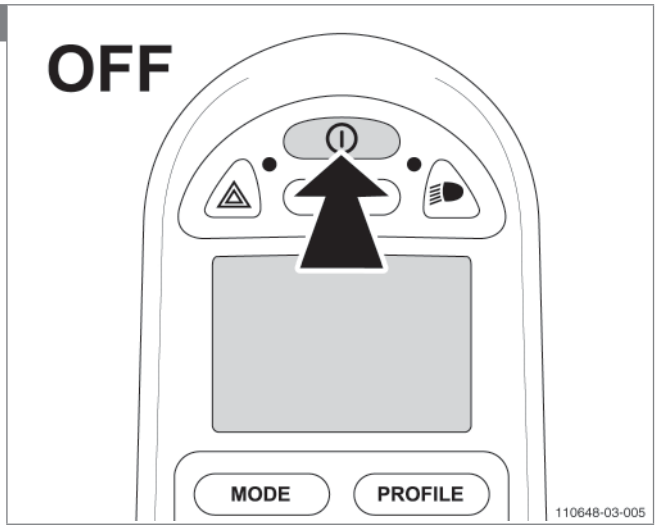
Icons
- Action must be carried out by two persons!
- **Note!** Be aware of the issue!

1



Note! Suitable work area required!

2



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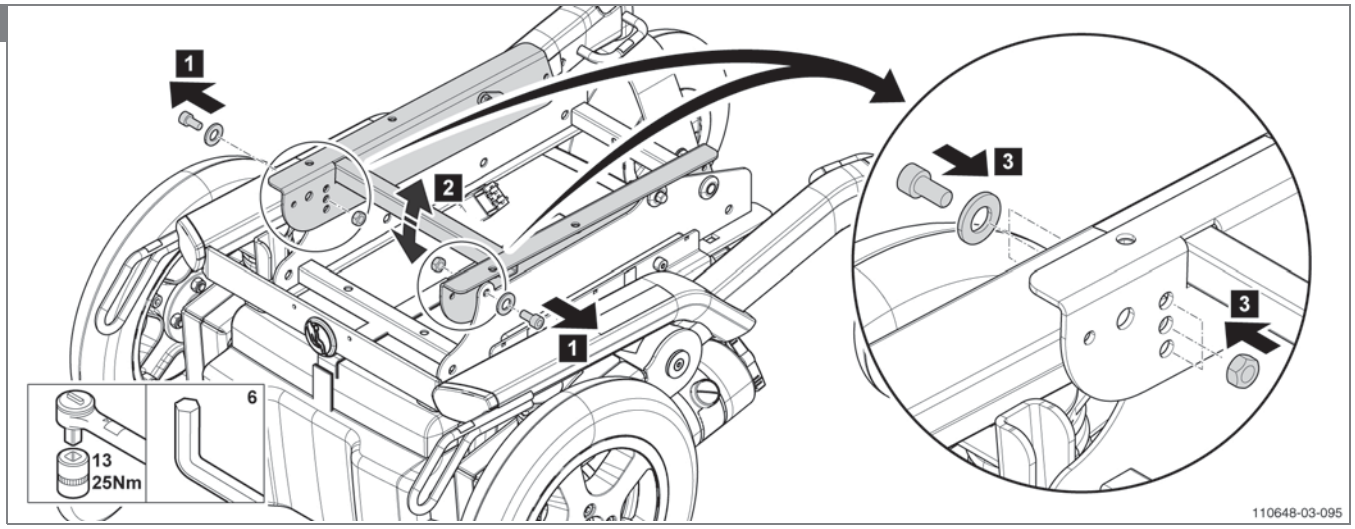


Caution! Changing the wheelchair’s tilt position may negatively influence the wheelchair’s driving characteristics! Please read the user manual!

6 Trouble shooting

If your Puma 20/40 is not working even though the batteries are fully charged, the following checks can be carried out before contacting your supplier.
Check whether all of the battery clips are firmly in place.
Check whether the freewheel handle is in the drive mode (and not in the freewheel / neutral mode).
Troubleshooting table
If your scooter is not working, or is not working as it should, go through the following list of possible problems before contacting your supplier. You may be able to solve the problem yourself.

6.1 Shark faultfinding table

Signal	Possible cause	Remedy
service indicator flashes once.	User error	This is probably a 'STALL' timeout. Place the joystick in neutral and try again
service indicator flashes twice	Battery fault	Check the batteries and the cabling Charge the batteries or replace them.
ON/OFF light flashes three times	The left-hand motor (m1) connection is faulty	Check the motor connections and cabling.
	The left-hand motor (m1) is defective	Replace this motor
ON/OFF light flashes four times	The connection of the right-hand motor (m2) is faulty.	Check the motor connections and cabling.
	The right-hand motor (m2) is defective	Replace this motor
ON/OFF light: flashes 5 times	The left-hand parking brake (m1) connection is faulty or loose.	Correct the connection
	The left-hand parking brake (m1) is defective.	Replace the parking brake
ON/OFF light: flashes 6 times	The right parking brake (m2) connection is faulty or loose.	Correct the connection
	The right-hand parking brake (m2) is defective.	Replace the parking brake
ON/OFF light flashes 7 timest	There is a fault in the controller	Check all connections and correct as necessary If a fault signal is still present after this, replace the power module.
ON/OFF light flashes 8 times	There is a fault in the power module	Check all connections and correct as necessary If a fault signal is still present after this, replace the power module.
ON/OFF light flashes 9 times	There is a communication fault in the Shark system.	Check the connection and correct it if necessary. If a fault signal is still present after this, replace the controller.
ON/OFF light flashes 10 times	Unknown fault	Check all connections and correct as necessary Consult a service engineer.
ON/OFF light flashes 11 times	System does not 'fit'. System modules are not compatible.	Check that the type of the controller corresponds with the power module. Replace one of the two if necessary.

Note:
If all the plugs are connected properly and you have used the troubleshooting list but not found the cause, contact the Service Department of Handicare.

⚠ Before changing Shark bus cables, fuses and/or modules, remove both fuses from the battery compartment, so that the system is dead.

6.2 R-net faultfinding table

Trip Text	Trip Code	Description
Joystick Error	-	The most common cause of this trip is if the joystick is deflected away from center before and during the time the control system is switched on. The joystick displaced screen will be displayed for 5 seconds, if the joystick is not released within that time then a trip is registered. Although a trip screen is not displayed the system log will show the trip and numbers of occurrences. • Ensure that the joystick is centered and power-up the control system. If the trip is still present then the joystick or Joystick Module may be defective.
Low Battery	-	This occurs when the control system detects that the battery voltage has fallen below 16V. • Check the condition of the batteries and the connections to the control system. If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective.
High Battery	-	This occurs when the control system detects that the battery voltage has risen above 35V. The most common reasons for this are overcharging of the battery or bad connections between the control system and the batteries. • Check the condition of the batteries and the connections to the control system. If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective.
M1 Brake Error	1505	This occurs when the control system detects a problem in the solenoid brakes or the connections to them. • Check the solenoid brakes, cables and connections to the control system. If the trip is still present after the above checks have been made, then the Power Module may be defective.
M2 Brake Error	1506	This occurs when the control system detects a problem in the solenoid brakes or the connections to them. • Check the solenoid brakes, cables and connections to the control system. If the trip is still present after the above checks have been made, then the Power Module may be defective.
M1 Motor Error	3B00	This occurs when the control system detects that a motor has become disconnected. • Check the motors, cables and connections to the control system. If the trip is still present after the above checks have been made, then the Power Module may be defective.
M2 Motor Error	3C00	This occurs when the control system detects that a motor has become disconnected. • Check the motors, cables and connections to the control system. If the trip is still present after the above checks have been made, then the Power Module may be defective.
Inhibit Active	1E01 1E09 1E0A	This occurs when any of the Inhibit inputs are active and in a latched state. The actual inhibit that is active is indicated by the last 2 digits in the Trip Code. • Cycle the power. This will drop out of Latched Mode which might clear the trip. • Check all wiring and switches connected to the indicated Inhibits. If the trip is still present after the above checks have been made, then the ISM may be defective.
Joystick Calibration Error	-	This occurs when the Joystick Calibration process has not been successful. • Enter OBP and attempt calibration. If the trip is still present after the above has been attempted, then the Joystick Module may be defective.
Latched Timeout	-	This occurs when the control system detects that the Latched Timeout programmed time has been exceeded. For example, the Input Device, Joystick, Head Aray, Sip and Puff, etc.) has not been operated frequently enough. The trip is a notification of why the control system has dropped out of Latched Mode. • Cycle the power. • Initiate Latched Mode. If the trip is still present after the above checks have been made, then the Input Device may be defective.
Brake Lamp Short	-	This occurs when the control system detects a short in the Brake Lamp Circuit. • Check the brake lamps, cables and connections to the control system. If the trip is still present after the above checks have been made, then the ISM may be defective.

Trip Text	Trip Code	Description
Left Lamp Short	7205	This occurs when the control system detects a short in either of the Lamp Circuits. • Check the lamps, cables and connections to the control system. If the trip is still present after the above checks have been made, then the ISM may be defective.
Right Lamp Short	7209	This occurs when the control system detects a short in either of the Lamp Circuits. • Check the lamps, cables and connections to the control system. If the trip is still present after the above checks have been made, then the ISM may be defective.
Left Indicator Lamp Short	7206	This occurs when the control system detects a short in either of the Indicator Circuits. • Check the indicators, cables and connections to the control system. If the trip is still present after the above checks have been made, then the ISM may be defective.
Right Indicator Lamp Short	720A	This occurs when the control system detects a short in either of the Indicator Circuits. • Check the indicators, cables and connections to the control system. If the trip is still present after the above checks have been made, then the ISM may be defective.
Left Indicator Lamp Failed	7207	This occurs when the control system detects a failure in either of the Indicator Circuits. This is most likely to be an indicator bulb failure. • Check the indicator bulbs, cables and connections to the control system. If the trip is still present after the above checks have been made, then the ISM may be defective.
Right Indicator Lamp Failed	7208	This occurs when the control system detects a failure in either of the Indicator Circuits. This is most likely to be an indicator bulb failure. • Check the indicator bulbs, cables and connections to the control system. If the trip is still present after the above checks have been made, then the ISM may be defective.
Over Current	-	This occurs when the control system detects that the ISM's actuator circuitry has become too hot. The control system will cease drive to the actuator motor in question. • Allow the ISM to cool. • If the ISM is frequently overheating check the condition of the actuator motors and the connections to them. • If the trip persists contact your service agent.
Overtemp. (Lamps)	-	This occurs when the control system detects that the ISM's actuator circuitry has become too hot. The control system will cease drive to the actuator motor in question. • Allow the ISM to cool. • If the ISM is frequently overheating check the condition of the actuator motors and the connections to them. • If the trip persists contact your service agent.
Overtemp. (Actuators)	-	This occurs when the control system detects that the ISM's actuator circuitry has become too hot. The control system will cease drive to the actuator motor in question. • Allow the ISM to cool. • If the ISM is frequently overheating check the condition of the actuator motors and the connections to them. • If the trip persists contact your service agent.
DIME Error	-	This occurs when the control system detects an identification conflict between two modules in the system. If a new module has been introduced: • Disconnect the new module and cycle the power. • If no trip is present connect the new module to the system and cycle the power. • If the trip reappears then the new module must be the cause of the problem. If there has been no additions: • Disconnect one module at a time and cycle the power. If the trip is still present after the above checks have been made, contact your service agent.

Trip Text	Trip Code	Description
Memory Error	-	This is a non specific memory error which could be caused by any of the modules within the system. • Check all cables and connections. • Cycle the power. If the trip is still present and the system contains 3rd party Modules: • Disconnect all the non PGDT modules and cycle the power. If this has cleared the trip: • Connect each 3rd party module in turn, cycling the power each time. • If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective. If the trip is still present after the above checks have been made, then the PM may be defective.
PM Memory Error	-	This is a specific Power Module based trip. • Check all cables and connections. • Using the R-net PC Programmer, re-program the control system. This should be done with either the most current specific program file for the wheelchair or the manufacturers original programming file. If the trip is still present after the above checks have been made, then the PM may be defective.
Bad Cable	-	This occurs when the control system detects a fault in the wiring in the communication cables between any of the modules. • Check all cables and connections for continuity. • If there is any visible damage to cables, replace and cycle power. • Disconnect one cable from the system at a time cycling the power after each disconnection. If the trip is still present after the above checks have been made, then the PM may be defective.
Bad Settings	-	This occurs when the control system detects incorrect or invalid program settings. • Check all parameter settings and re-program the control system using the R-net PC Programmer. • Make a note of the current parameter settings and then reset the control system to default settings. • Re-program the required settings in small groups, cycling the power after each group to see if the trip occurs. If the trip is still present after the above checks have been made, then the PM may be defective.
Module Error	-	This occurs when the control system detects a trip within a specific module. The module will be identified on the diagnostics Screen. • Check all cables and connections. • Cycle the power. If the trip is still present after the above checks have been made, then the module identified may be defective.
System Error	-	This occurs when the system detects a trip which cannot be attributed to a specific module. • Check all cables and connections. • Cycle the power. If the trip is still present and the system contains 3rd party Modules: • Disconnect all the none PGDT modules and cycle the power. If this has cleared the trip: • Connect each 3rd party module in turn, cycling the power each time. • If the trip reappears after one of the power cycles then the last module to have been added to the system must be defective. If the trip is still present after the above checks
SID Detached	-	The Omni has detected that the Specialty Input Device (SID) has become disconnected. • Check all cables and connectors between the Omni and the SID. If the error persists: • Check that the setting of the parameter, 9-Way Detect, is appropriate for the SID that is being used. For example, if the SID has no detect-link, then this parameter should be set to Off. If the trip is still present after the above checks have been made, then the Input Device may be defective. Contact your service agent.

Trip Text	Trip Code	Description
User Switch detached	-	The Omni has detected that the User Switch has become disconnected. • Check all cables and connectors between the Omni and the User Switch. If the trip is still present after the above checks have been made, then the User Switch may be defective. Contact your service agent. If it is required to use the Omni without a User Switch being connected, then the parameter, Switch Detect, should be set to Off. If a User Switch is not used the responsibility for that decision lies with the healthcare professional.
Gone to Sleep		This occurs when the control system has been left inactive for a time greater than the parameter Sleep Timer. An entry is made in the system log each time this occurs.
Charging		This occurs when the control system detects that a charger is connected to either Inhibit 1 or Inhibit 3. Refer to section 2.3 for connection details The Battery charging screen will be displayed during charger connection. An entry is made in the system log each time this occurs. If an On-Board Charger is used: • Disconnect the charger from the AC supply. If an Off-Board Charger is used: • Disconnect the charger from the Wheelchair. If the trip is still present after the charger has been disconnected then the Joystick Module may be defective.

6.3 DX2 faultfinding table

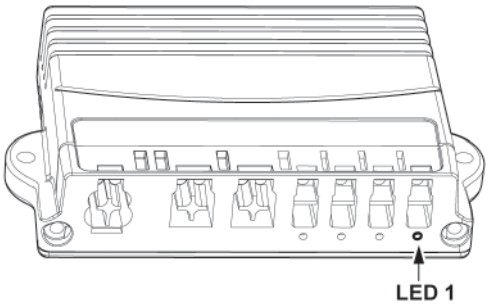
Signal	Possible cause	Remedy
ON/OFF light does not go on: the wheelchair does not move.	The controller plug is not properly inserted in the ‘power module’.	This is probably a 'STALL' timeout. Place the joystick in neutral and try again
	Both fuses are defective	Replace the defective fuses.
	The batteries are not properly connected.	Check the connections.
	A connection of the batteries is loose.	Secure the connection.
ON/OFF light: flashes once	DX module faulty.	Replace one or more modules. The "on/off" LED indicates the condition of the entire system. The modules all have a separate status LED: in this way, you can see which one is faulty.
ON/OFF light: flashes twice.	DX accessory faulty.	The module displays a fault as a result of a programming fault or short circuit and/or overload of the accessories. The (optional) electrical high/low adjustment is not in the lowest position. The LED flashes twice to indicate that the speed limitation has been switched on: the wheelchair will drive considerably more slowly.
ON/OFF light: flashes three times	The left-hand motor (m1) connection is faulty or loose	Check the connection and secure it.
	The left-hand motor (m1) is defective	Replace this motor.
	Short circuit in the left-hand motor (m1) connections.	Correct the connections.
	Defective power module output.	Check the motor for a defect: an output of the power module will only become defective through a defect in the motor itself. Only replace the power module if the fault occurs immediately upon switching the unit on. If the fault occurs when you are starting to drive, the entire left-hand motor circuit is causing the fault. In this case, replace the entire drive unit concerned.
ON/OFF light: flashes four times	The right-hand motor (m2) connection is faulty or loose.	Check the connection and secure it
	The right-hand motor (m2) is defective	Replace this motor.
	Short circuit in the right-hand motor (m2) connections.	Correct the connections.
	Defective power module output.	Check the motor for a defect: an output of the power module will only become defective through a defect in the motor itself. Only replace the power module if the fault occurs immediately upon switching the unit on. If the fault occurs when you are starting to drive, the entire left-hand motor circuit is causing the fault. In this case, replace the entire drive unit concerned.
ON/OFF light: flashes 5 times	The left-hand parking brake (m1) connection is faulty or loose.	Correct the connection.
	The left-hand parking brake (m1) is defective.	Replace the drive motor.
ON/OFF light: flashes 6 times	The right parking brake (m2) connection is faulty or loose.	Correct the connection.
	The right-hand parking brake (m2) is defective.	Replace the drive motor.
ON/OFF light: flashes 7 times	The battery voltage is low, or the batteries are flat or bad	Charge the batteries or replace them. Note: If the voltage is low (< 12 V) the electronics will not work properly. A number of random LEDs of the ‘DX’ controller flash and the wheelchair will not function.
ON/OFF light: flashes 8 times	The battery voltage is high, above 32 V.	This usually occurs during (trickle) charging. Frequent occurrence will result in a defective power module. Set the charger correctly.
ON/OFF light: flashes 9 times	'BUS low' fault: cable breakage (in one of the DX bus cables) or short circuit in the DX bus system (entrances to the modules)	Check the cables and the modules and replace if necessary.
ON/OFF light: flashes 10 times	Bus high fault: usually a communication fault caused by one of the DX bus cables or DX modules (entrances to the modules)	Check the cables and the modules and replace if necessary.

Signal	Possible cause	Remedy
ON/OFF light: flashes 11 times	'STALL' overload fault: A motor is continually demands too much power.	Check the drive units. Note: This fault is often caused by taking obstacles that are too high, or driving against walls, and door frames, etc. This fault may also be caused by a difficult turn from a standing position. Check the weight distribution of the chair.
ON/OFF light: flashes 12 times	System does not 'fit'. System modules are not compatible.	*Program the entire drive system for the relevant wheelchair with the aid of the DX-Wizard program on the PC.* Always confirm the programming by switching the wheelchair on and off.

Note:
If all the plugs are connected properly and you have used the troubleshooting list but not found the cause, contact the Service Department of Handicare.

⚠ Before changing DX bus cables, fuses and/or modules, remove both fuses from the battery compartment, so that the system is dead.

DX2-ACT Flash Code List



Note:
These flash codes are the Actuator Module flash codes that are visible on LED 1 of the Actuator Module. They are not the DX System flash codes that are visible on the DX System status LED on the Master Remote. For DX System flash codes, see DX2 faultfinding table

Flash Code	Fault source	Sub code (HHP)	Meaning
01	User	00	Wizard programming in progress • Finish programming and then turn the system off and on. • Make sure that you wait 10 seconds after you have turned the system off before you turn it on again.
		01	Power Down in progress • Wait 10 seconds before you turn the system on again.
		02	Joystick source changed to a joystick that is not in the centre position • Release the joystick to the centre
		03	Invalid Actuator Profile (A-F) or direction demand • If this happens often, contact the Service Department of Handicare
02	Slow function battery	none	see DX2 System condition indications
		00	Battery Voltage too low or too high • Check the batteries and the cables • Batteries may be empty: charge the batteries • Batteries may be damaged: replace the batteries Batteries may be overcharged: if driving downhill, slow down
03	Actuator	00 01 02 03	Internal current or Voltage fault • Contact the Service Department of Handicare
		04 05	Actuator motor voltage is not what it should be during drive Possible motor short circuit • check the actuator cables for damage • check that the actuator is not faulty • Otherwise internal controller fault, contact the Service Department of Handicare
		06	Failed To Stop
		07	Too Many Fast Current Limit Events
		08	Driving Stopped Due To Trip
		All other	Internal fault • Contact the Service Department of Handicare
06	Configuration	01	Module ID collision • Check that multiple Actuator Modules in the system do not have the same ID
		02	System check failed
		03	Missing system check
		05	DX System internal fault Actuators will not move when the DX System itself is in a fault state
		All other	Internal DX2-ACT configuration fault • Check DX BUS cables • Turn the system off and on several times. Make sure to wait 10 seconds before you turn the system on again. • If turning the system off and on does not help, contact the Service Department of Handicare

Flash Code	Fault source	Sub code (HHP)	Meaning
09, 10	DX BUS	All	DX BUS hardware fault • Check DX BUS cables • Turn the system off and on several times. Make sure to wait 10 seconds before you turn the system on again. • If all DX BUS connections are OK and turning the system off and on does not help, contact the Service Department of Handicare
All other	Internal fault	All	Contact the Service Department of Handicare

DX2 System condition indications

	Condition	DX2-ACT indication	DX2-REM550 indication (DX2)	DX-REMG90 indication (DX)
DX System Faults	CLAM is enabled	None, but ACT will not drive actuators	None	None
	Master Remote in Fault State	FC6	FC according to fault	FC according to fault
	DX2-ACT detects CAN Fault	FC6/9/10, depending on actual fault	FC according to fault detected by Remote	FC according to fault detected by Remote
Actuator System Configuration Faults	Module ID Collision (2 modules with same ID)	FC6, No DX BUS communication	Actuator system will be "missing"*	None
	ACT Module Missing "Slow1/Slow2"	None	FC2, Drive inhibit*	Not detected
	ACT Module Missing "Stop"	None	FC2*	Not detected
	Actuator Module Local Fault	FC2 on remaining ACT Module	Drive Inhibit	Drive Inhibit
	Actuator Module Local Fault	See DX2-ACT Flash Code List	None	None
ACI “Slow” function active	ACI "Flash Code 2"	FC2	FC2	FC2
	ACI "Stop (Drive Inhibit)"	FC2	Drive inhibit	Drive inhibit
	ACI "System Slowdown"	FC2	FC2	FC2
	ACI "Local Slow"	FC2	Reduced speed on Speedometer	None
	ACI in Speed Pot or Speed Limit mode, with outputs less than 100%	FC2	Reduced speed on Speedometer	None

*The REM550 responds to a missing DX2 actuator system if the following parameters are set:

Parameter	Required Value
Actuator System Type	DX2 Actuator System
Actuator System Is Critical	Yes
Actuator System Missing	"Stop Drive" or "Slowdown Drive", as desired.

6.4 VR-2 faultfinding table

Trip Types and Their Possible Causes
Once the trip type has been established, refer to the relevant section below for further information.

Trip code	Trip Type	Description & Reference
1320	-	Refer to "Current Limit Active"
1505	9	Left Selenoid Brake Trip, refer to "Type 9 - Solenoid Brake Trip"
1506	9	Right Selenoid Brake Trip, refer to "Type 9 - Solenoid Brake Trip"
1600	10	High Battery Voltage, refer to "Type 10 - High Battery Voltage"
1E03	Charging	Refer to "Type 6 - Charger Connected"
1E04	6	Refer to "Inhibit 2 Active"
1E05	Charging	Refer to "Inhibit 3 Active"
2C00	1	Low Battery Voltage, refer to "Type 1 - Low Battery Voltage"
2C02	-	Low Battery Lockout, refer to "Type 1 - Low Battery Voltage"
2F00	User	Refer to sections, refer to "Type 7 - Possible Joystick Trip" & "Joystick Displaced at Power-up"
3B00	2	Left Motor Disconnected, refer to "Type 2 - Left Motor Disconnected"
3C00	4	Right Motor Disconnected, refer to "Type 4 - Right Motor Disconnected"
3D00	3	Left Motor Wiring Trip, refer to "Type 3 - Left Motor Wiring Trip"
3D01	3	Left Motor Wiring Trip, refer to "Type 3 - Left Motor Wiring Trip"
3E00	5	Right Motor Wiring Trip, refer to "Type 5 - Right Motor Wiring Trip"
3E01	5	Right Motor Wiring Trip, refer to "Type 5 - Right Motor Wiring Trip"
4401	8	Control System Trip, refer to "Type 8 - Possible Control System Trip"
5400	7 + S *	Communications Trip, refer to "Communication Error"
7A03	A Only **	Actuator Motor Wiring Trip, refer to "Actuator Motor Wiring Trip"
7100	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7101	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7102	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7103	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7104	7	Joystick Trip, refer to "Type 7 - Possible Joystick Trip"
7147	User	Dual Joystick Displaced Refer to "Joystick Displaced at Power-up"
7902	-	Refer to "High Temperature"
All Other Codes	7 or 8	Possible Control System Trip, refer to "Type 7 - Possible Joystick Trip" & "Type 8 - Possible Control System Trip"

* - S = Flashing Speed Indicator LED's.
** - A = Flashing Actuator LED's

Trip	Possible cause	Remedy
Type 1	Low Battery Voltage	This occurs when the control system detects that the battery voltage has fallen below 16V. Check the condition of the batteries and the connections to the control system. If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to Section 5. In the case of 2C02 the Control System is making a log of the times that the Low Battery Lockout has been initiated.
Type 2	Left Motor Disconnected	This occurs when the control system detects that the left motor has become disconnected. Check the left motor, motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the right motor. Consult the wheelchair manufacturer for more details.
Type 3	Left Motor Wiring Trip	This occurs when the control system detects a fault in the wiring to the left motor. In particular if a motor connection has short-circuited to a battery connection. Check the left motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the right motor. Consult the wheelchair manufacturer for more details.

Trip	Possible cause	Remedy
Type 4	Right Motor Disconnected	This occurs when the control system detects that the right motor has become disconnected. Check the right motor, motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the left motor. Consult the wheelchair manufacturer for more details.
Type 5	Right Motor Wiring Trip	This occurs when the control system detects a fault in the wiring to the right motor. In particular if a motor connection has short-circuited to a battery connection. Check the right motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5. The VR-2 control system may be programmed to exchange the left and right motor outputs. In this instance, this section will refer to the left motor. Consult the wheelchair manufacturer for more details.
Type 6	Charger Connected	This occurs when the control system detects that an off-board charger is connected. Check that the battery charger is disconnected. If the trip is still present after the charger has been disconnected then the Joystick Module may be defective. Refer to Section 5.
Type 7	Possible Joystick Trip	This occurs if the control system detects a problem within its own joystick, or there is a communications error between the Joystick Module and Power Module. The joystick can only be replaced by a person authorized by the wheelchair manufacturer. 7100 Loss of comms to the joystick, check the joystick cable and, if you have authorization the joystick ribbon cable, connections and mating sockets. 7101 Loss of comms to the joystick, check the joystick cable and, if you have authorization the joystick ribbon cable, connections and mating sockets. 7102 Loss of power to the joystick, check check the joystick cable and, if you have authorization the joystick ribbon cable, connections and mating sockets. 7103 Internal trip, if you have authorization check the joystick ribbon cable, connections and mating sockets. Ensure the cable is connected correctly to both the joystick and the PCB. 7104 Internal trip, if you have authorization check the joystick ribbon cable, connections and mating sockets. Ensure the cable is connected correctly to both the joystick and the PCB. Refer to Section 1.2 for details on removal, fitting and calibration of the joystick. If the trip is still present after the appropriate checks have been made then the Joystick Module may be defective. Refer to Section 5.
Type 8	Possible Control System Trip	This occurs if the control system detects a problem within itself. The control system can only be repaired by an authorized person. Refer to Section 5.
Type 9	Solenoid Brake Trip	This occurs when the control system detects a problem in the solenoid brakes of the connections to them. 1505 - Left Brake Trip 1506 - Right Brake Trip Check these connections and the solenoid brakes. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.
Type 10	High Battery Voltage	This occurs when the control system detects that the battery voltage has risen above 35V. The most common reason for this are overcharging of the battery or bad connections between the control system and the batteries. If the trip is still present after the batteries and connections have been checked, then the Power Module may be defective. Refer to Section 5.

Possible cause	Remedy
Joystick Displaced at Power-up	The most common cause of this trip is if the joystick is deflected away from the center when the control system is being switched on. When the control system is switched on, the battery gauge will blink for a short time. Check that the user is not deflecting the joystick before the blink finishes. If the problem persists, refer to section .37.
Communication Error	The most likely cause of a communication error is a defective cable between the Power Module and the Joystick Module. The cable should be checked for damage, and replaced if found to have a fault. The Joystick Cable can only be replaced by a person authorized by the wheelchair manufacturer. Refer to Section 1.3 for the replacement procedure. If the problem persists then either the Power Module or the Joystick Module could be defective. Refer to Section 5.
Inhibit 2 Active	This occurs when the Inhibit 2 Input is active. The Inhibit 2 input is via the INH-2 way connector and is normally associated with speed limit or actuator functions. The operation of Inhibit 2 will depend upon the programmed settings and the wheelchair on which it is being used. Check all wiring and switches connected to Inhibit 2. If these appear to be in working order, then the Power Module may be defective. Refer to Section 5.
Inhibit 3 Active	This occurs when the Inhibit 3 Input is active. The Inhibit 3 input is via the 3 way on-board charger (OBC) and is normally associated with this function. The operation of Inhibit 3 will depend upon the programmed settings and the wheelchair on which it is being used. Check all wiring, switches and OBC (if fitted) connected to Inhibit 3. If these appear to be in working order, then the Power Module may be defective. Refer to Section 5.
Actuator Motor Wiring Trip	This occurs when the control system detects a fault in the wiring to either actuator motor. Check the motor connectors and wiring. If the trip is still present after the above checks have been made, then the Power Module may be defective. Refer to Section 5.
Current Limit Active	This occurs when the control system operates above the Current Limit Threshold for a periode of time greater than the Current Limit Time. It has been designed to notify the Healthcare Technician that the control system has operated outside of its programmed range.
High Temperature	This occurs when the control system reaches its Temperature Threshold and thus becomes to hot. The controller will not allow drive until the controller to cooled down. An entry is made in the system log each time the controller gets too hot and goes out of drive.

7 Technical product information

7.1 CE Declaration and standards

This product complies with the COUNCIL DIRECTIVE 93/42/EEC of 14 June 1993 concerning medical devices. The product also meets the following requirements and standards. This has been verified by independent test organizations.

Standard	Definition/description	Test dummy weight
EU guideline 93/42 EEC	93/42 EEC Requirements as stated in Appendix 1 apply n/a	n/a
NEN-EN 12182	The EN 12182 requirements as stated in NEN-EN 12184 (2009): Technical aids for disabled persons - General requirements and test methods October 1999	160 kg
NEN-EN 12184 (2009) Class B	Electrically powered wheelchairs, scooters and their chargers - Requirements and test methods October 2009	160 kg
ISO 7176-8	Requirements and test methods for impact, static and fatigue strengths July 1998	160 kg
ISO 7176-9	Climatic tests for electric wheelchairs IPX4	n/a
ISO 7176-14	Requirements and test methods for power and control systems for electrically powered wheelchairs 1997	n/a
ISO 7176-16	Requirements for resistance to ignition of upholstered parts May 1997	n/a
ISO 7176-19 (2008)	The Puma 40/20 meets the crash test requirements as described in ISO 7176-19 (2008)	75 kg

7.2 Technical information

Batteries	Max.	Unit
Maximum battery dimensions 2	260 x 172 x 210 (10.25 x 6.75 x 8.25)	mm inch
Battery capacity	40 / 60 / 74 GEL; 50 AGM	Ah (C20)
Maximum permissible charging voltage	24	V
Maximum charging current	12	A (rms)
Connector type	Controller	
Insulation Class 2 double insulated	Class 2 double insulated	

Model		PUMA 40	
Class		B	
Description	Unit	FWD	RWD
Total length including legrests	mm (inch)	1190 (46.9)	1115 (43.9)
Total width 13” drive wheels	mm (inch)	610 (24)	
Total width 14” drive wheels	mm (inch)	655 (25.8)	
Total weight without batteries:	kg (lbs.)	97,6 (15.4)	
Batteries 40 Ah (C20) (set of two)	kg (lbs.)	+ 28,4 (4.5)	
Batteries 50 Ah (C20) (set of two)	kg (lbs.)	+ 29,6 (4.7)	
Batteries 60 Ah (C20) (set of two)	kg (lbs.)	+ 34,6 (5.5)	
Batteries 74 Ah (C20) (set of two)	kg (lbs.)	+ 45,8 (7.2)	
Electrical high/low adjustment	kg (lbs.)	+ 18,8 (3)	
Electrical tilt adjustment	kg (lbs.)	+ 9,8 (1.5)	
Electrically reclining backrest	kg (lbs.)	+ 1,5 (3.3)	
Electrically elevating legrests	kg (lbs.)	+ 4 (8.8)	
Puncture-proof drive wheels (set of two)	kg (lbs.)	+ 8,4 (1.3)	
Transport weight of the heaviest part	kg (lbs.)	97,6 (15.4)	
Maximum safe slope	° (%)	10 (17.6)	

* The following aspects have a negative effect on the distance range: obstacles, rugged terrain, driving on slopes, exposure to temperatures below freezing point and frequent use of electronic adjustment options.

** Seat height incl. load, 0° seat angle and 14” drive wheels

Model		PUMA 40	
Class		B	
Description	**Unit**	**FWD**	**RWD**
Static stability Downwards Upwards Sidewards	 ° ° °		 15 15 15
	mm (inch)	1200 (47.2)	1330 (52.4)
Distance range* 74 Ah (C20) approx. (ISO 7176-4) 6 km/h 10 km/h	 km (mi.) km (mi.)	 36 (22.4) 27 (16.8)	
Climbing capacity for obstacles (outdoor)	mm (inch)	60 (2.4)	80 (3.1)
Maximum speed forwards	km/h	6 / 10	
Seat angle adjustment	°	0 - 6	
Effective seat depth	mm (inch)	420 - 600 (16.5 - 23.6)	
Effective seat width	mm (inch)	420 - 540 (16.5 - 21.3)	
Seat height (excl. cushion)**	mm (inch)	415 (16.3)	
Seat height (incl. cushion)**	mm (inch)	485 (19.1)	
Backrest angle	°	89 - 118	
Backrest height	mm (inch)	500 - 640 (19.7 - 25.2)	
Lower leg length	mm (inch)	350 - 515 (13.8 - 20.3)	

* The following aspects have a negative effect on the distance range: obstacles, rugged terrain, driving on slopes, exposure to temperatures below freezing point and frequent use of electronic adjustment options.

** Seat height incl. load, 0° seat angle and 14” drive wheels

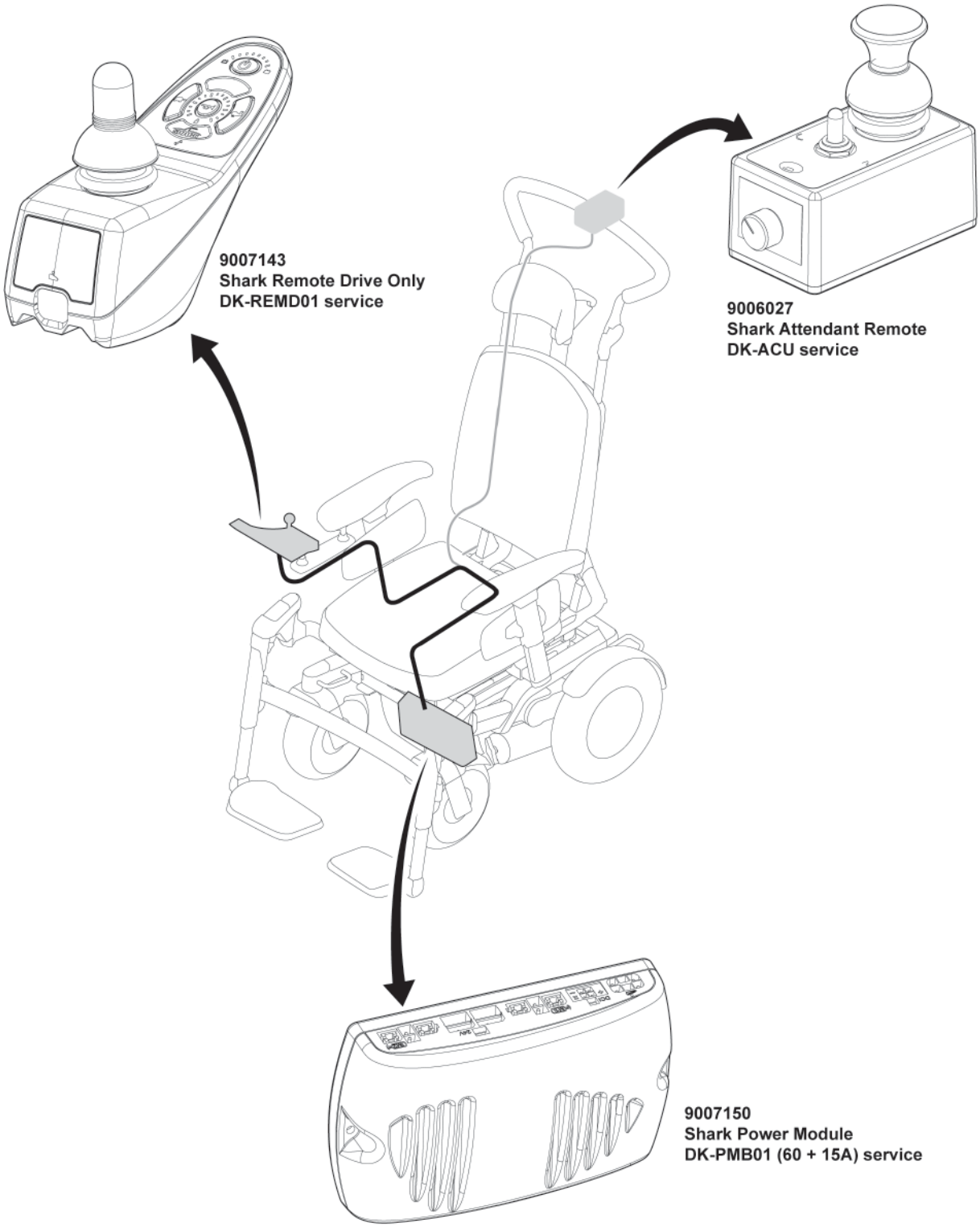
Model		PUMA 20	
Class		B	
Description	**Unit**	**FWD**	**RWD**
Total length including legrests	mm (inch)	1160 (45.7)	1095 (43.1)
Total width 13” drive wheels Total width 14” drive wheels	mm (inch) mm (inch)	610 (24) 655 (25.8)	
Total weight without batteries: Batteries 40 Ah (C20) (set of two) Batteries 50 Ah (C20) (set of two) Batteries 60 Ah (C20) (set of two) Batteries 74 Ah (C20) (set of two) Electrical tilt adjustment Puncture-proof drive wheels (set of two)	kg (lbs.) kg (lbs.) kg (lbs.) kg (lbs.) kg (lbs.) kg (lbs.) kg (lbs.)	77,6 (12.2) + 28,4 (4.5) + 29,6 (4.7) + 34,6 (5.5) + 45,8 (7.2) + 6,5 (1) + 2 (0.3)	
Transport weight of the heaviest part	kg (lbs.)	77,6 (12.2)	
Maximum safe slope	° (%)	10 (17.6)	
Static stability Downwards Upwards Sidewards	 ° ° °		 15 15 15
	mm (inch)	1200 (47.2)	1330 (52.4)
Distance range* 74 Ah (C20) approx. (ISO 7176-4) 6 km/h 10 km/h	 km (mi.) km (mi.)	 36 (22.4) 27 (16.8)	
Climbing capacity for obstacles (outdoor)	mm (inch)	60 (2.4)	80 (3.1)
Maximum speed forwards	km/h	6 / 10	
Seat angle adjustment	°	0 - 6	
Effective seat depth	mm (inch)	420 / 440 / 460 / 480 / 500 (16.5 / 17.3 / 18.1 / 18.9 / 19.7)	
Effective seat width	mm (inch)	420 - 510 (16.5 - 20.1)	
Seat height (excl. cushion)**	mm (inch)	405 (15.9)	
Seat height (incl. cushion)**	mm (inch)	455 (17.9)	
Backrest angle	°	92 / 97 / 102 / 107	
Backrest height	mm (inch)	480 (18.9)	
Lower leg length	mm (inch)	360 - 460 (14.2 - 18.1)	

* The following aspects have a negative effect on the distance range: obstacles, rugged terrain, driving on slopes, exposure to temperatures below freezing point and frequent use of electronic adjustment options.

** Seat height incl. load, 0° seat angle and 14” drive wheels

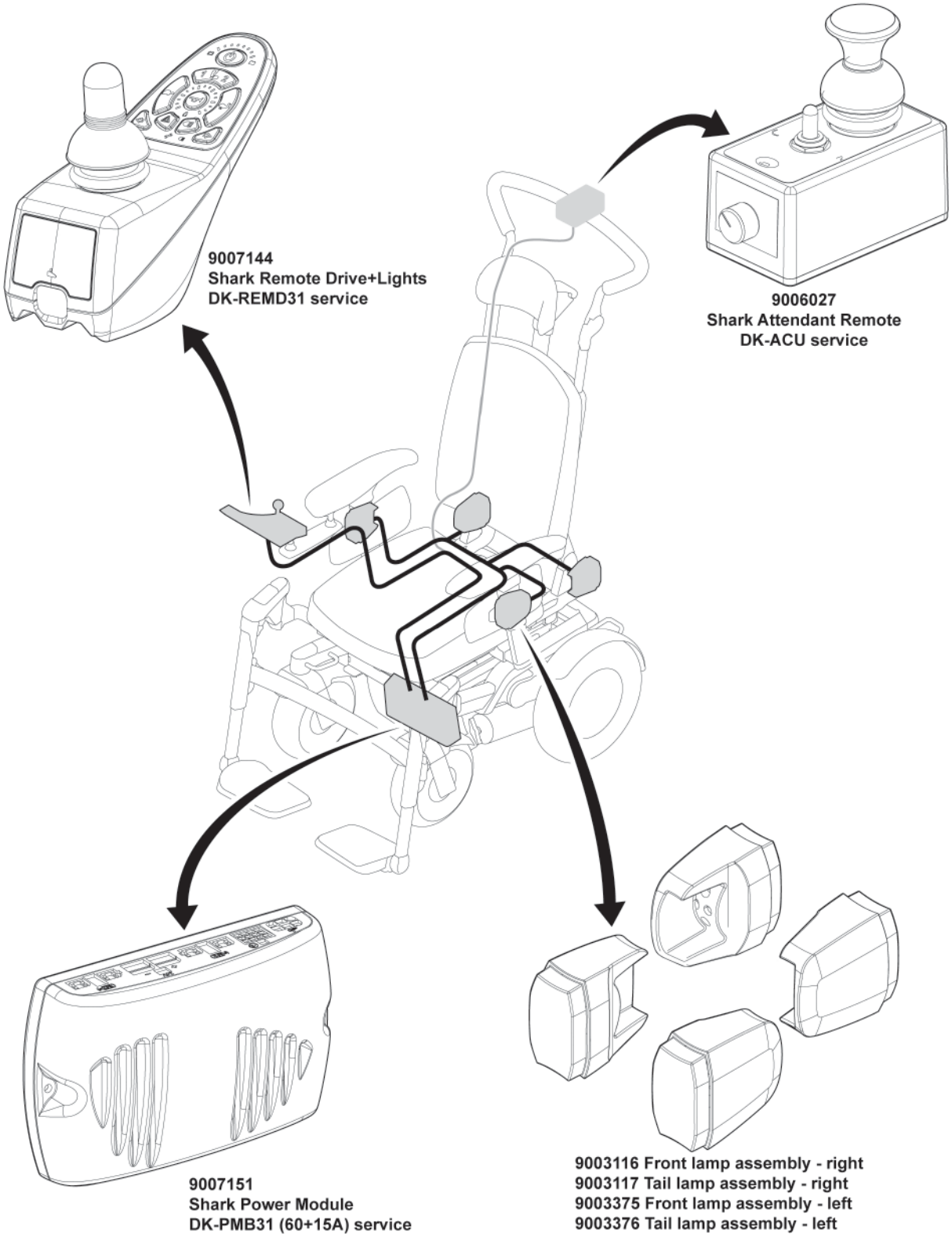
7.3 Electrical diagram

Shark; drive only



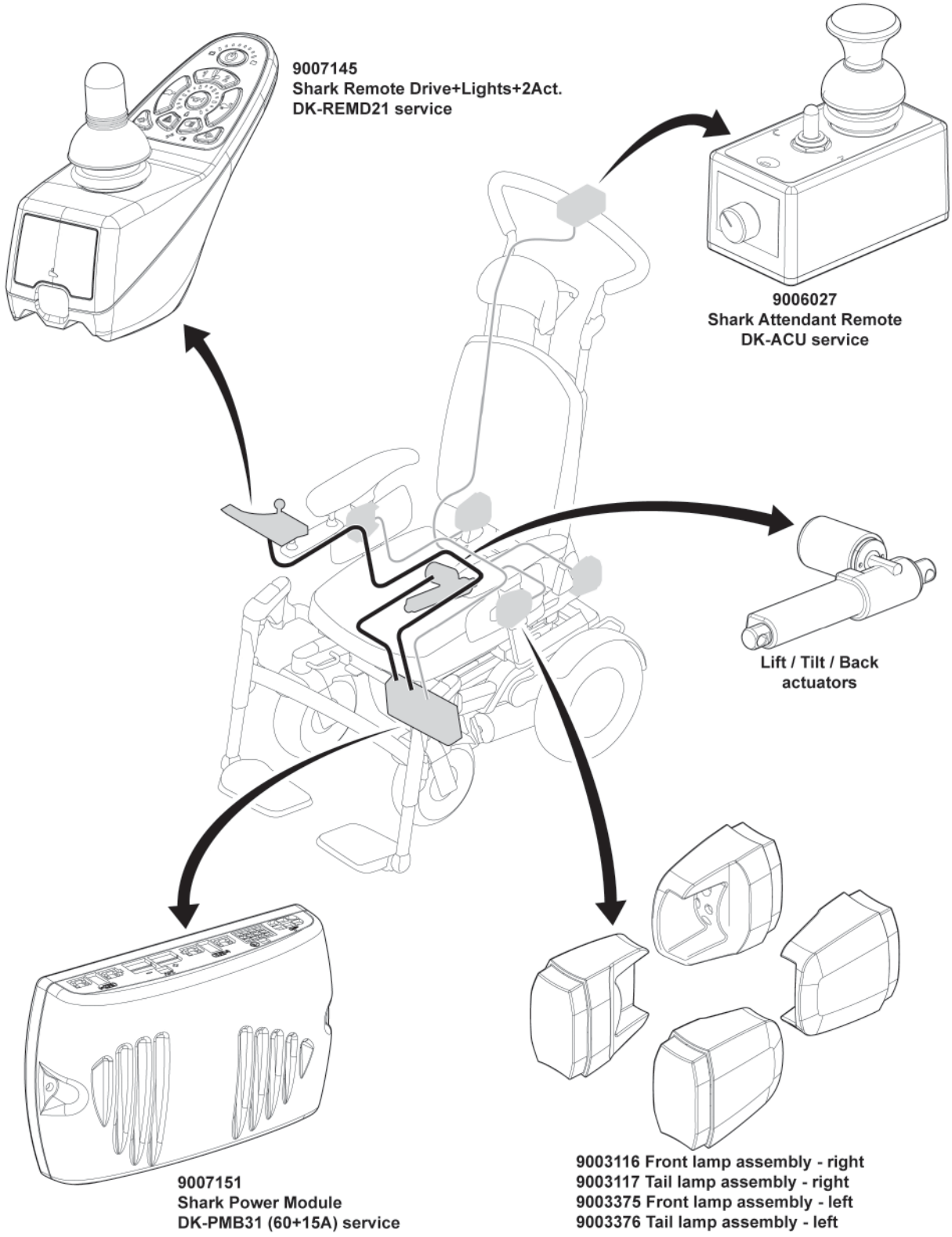
To determine the correct remote control, power module, bus and cables for the Shark system in all possible models, please follow the questionary in the Shark-flowchart on page 23.

Shark; drive and lights



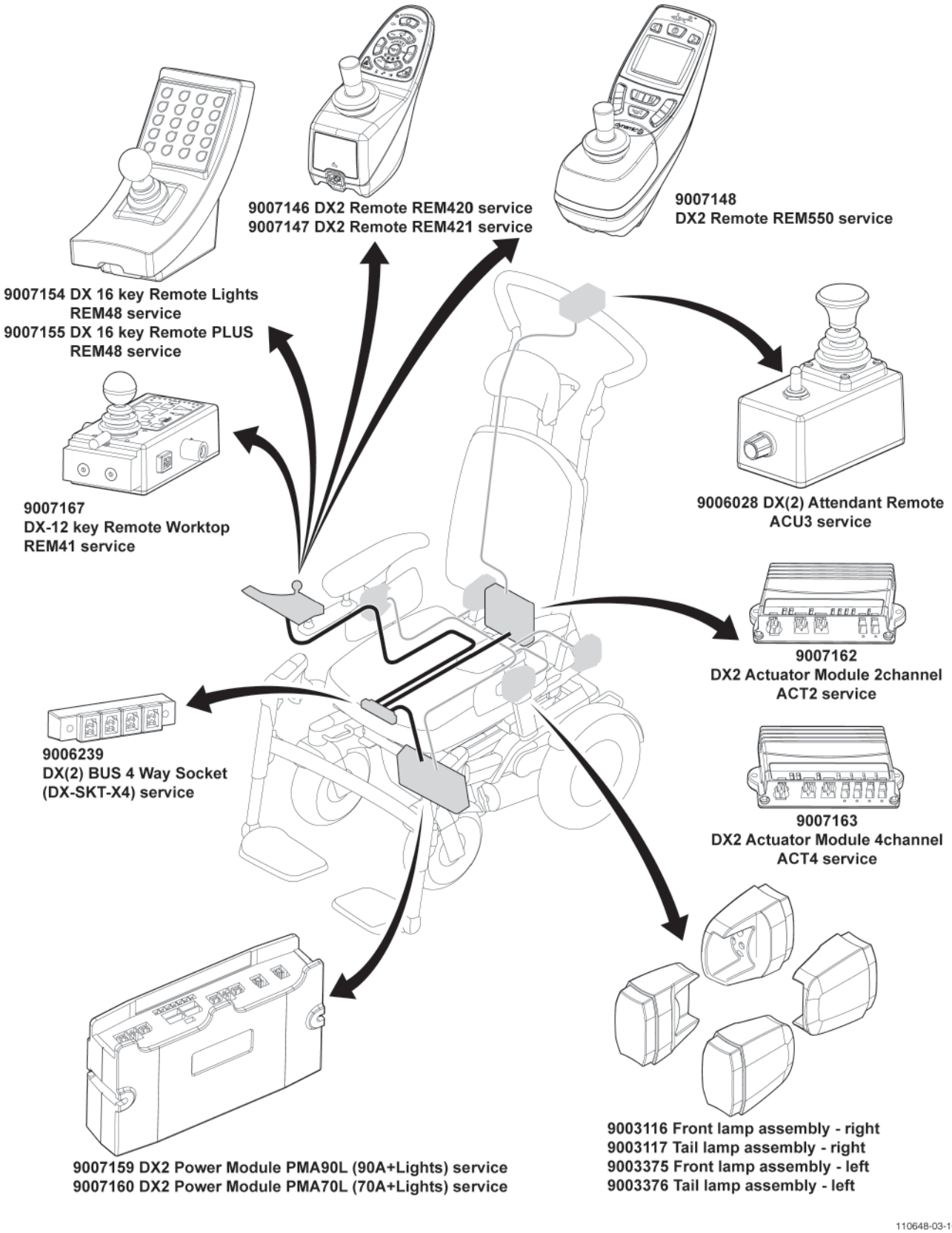
To determine the correct remote control, power module, bus and cables for the Shark system in all possible models, please follow the questionary in the Shark-flowchart on page 23.

Shark; drive, lights & seats



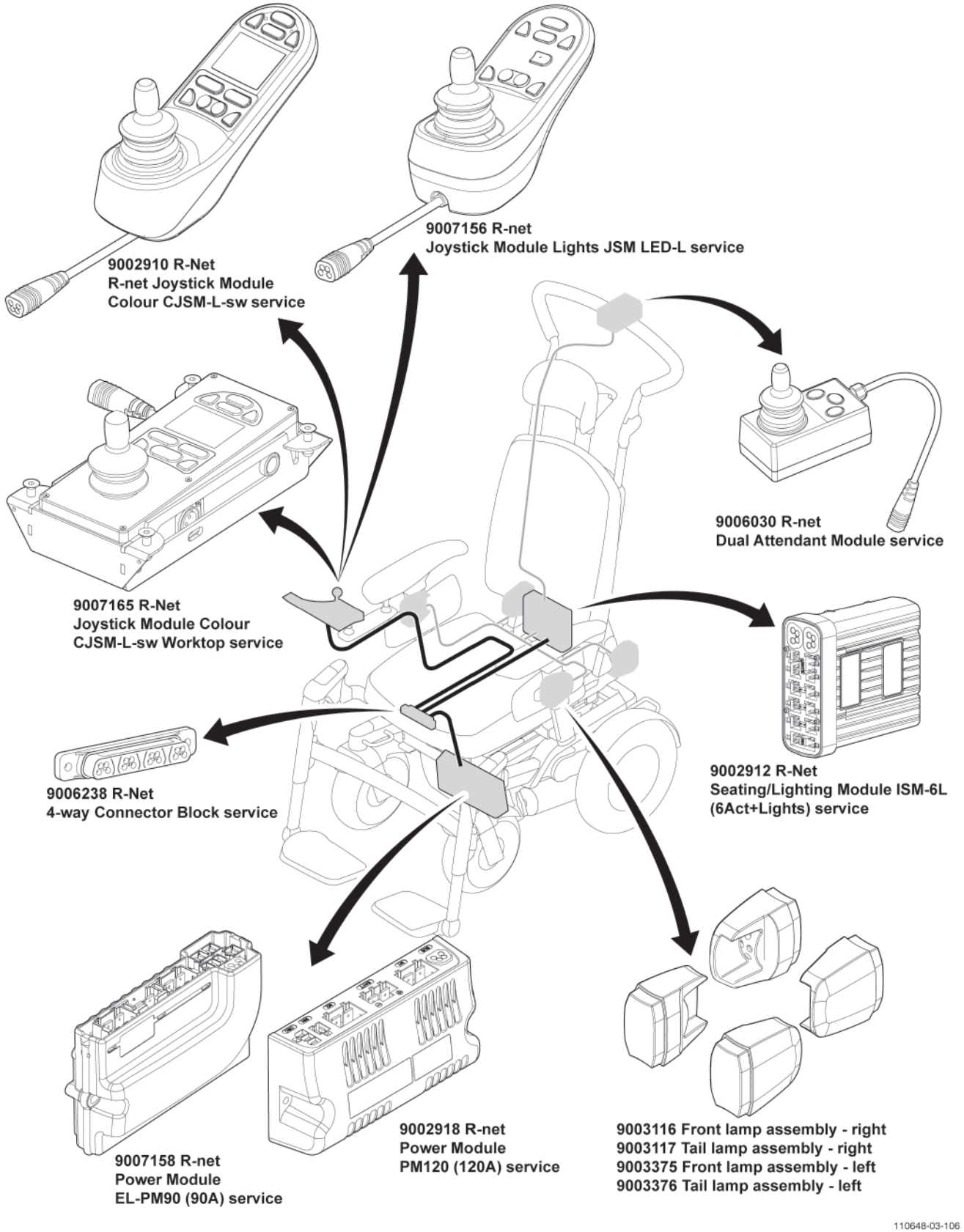
To determine the correct remote control, power module, bus and cables for the Shark system in all possible models, please follow the questionary in the Shark-flowchart on page 23.

DX2



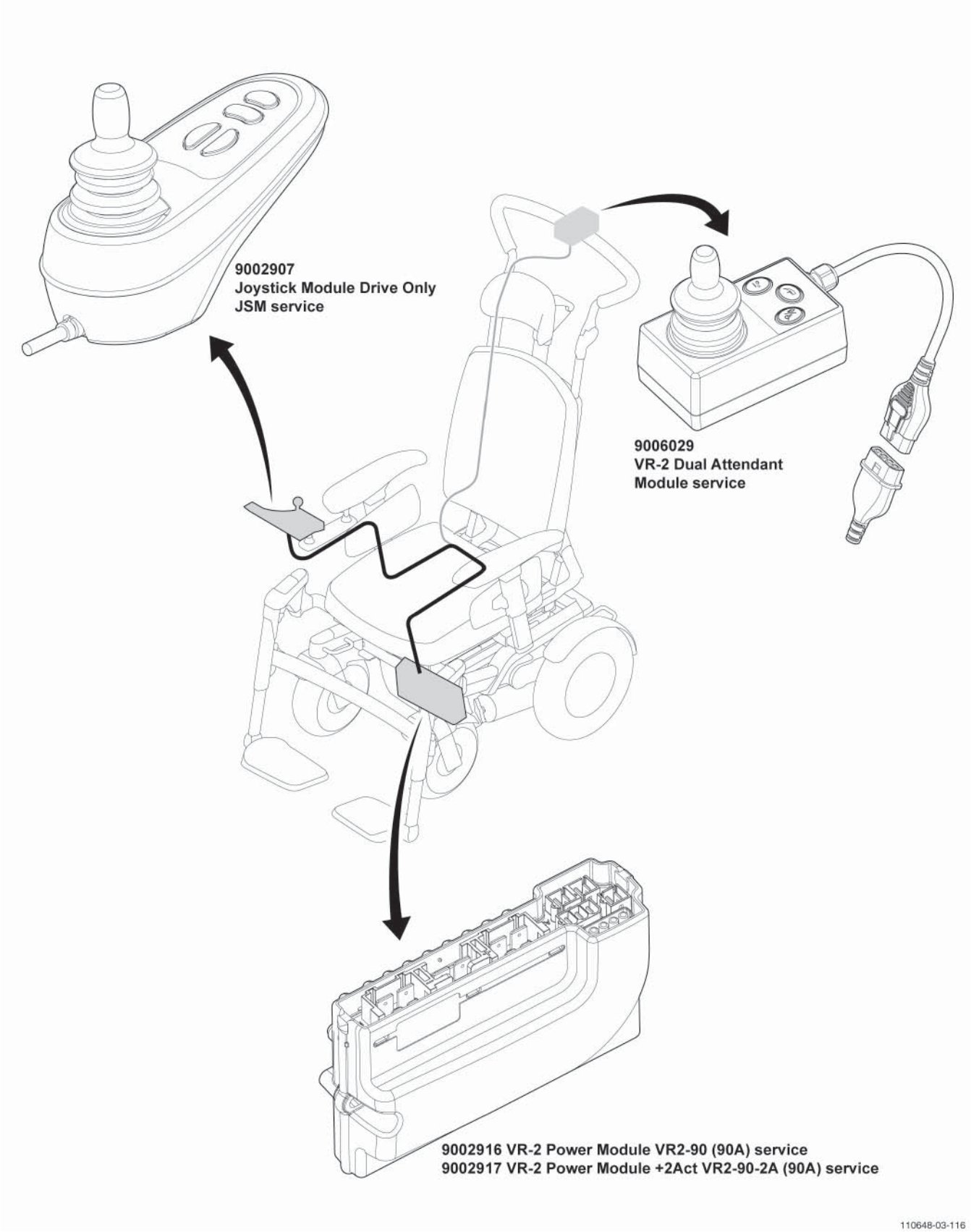
To determine the correct remote control, power module, bus and cables for the DX2 system in all possible models, please follow the questionary in the DX2 flowchart on page 27.

R-net



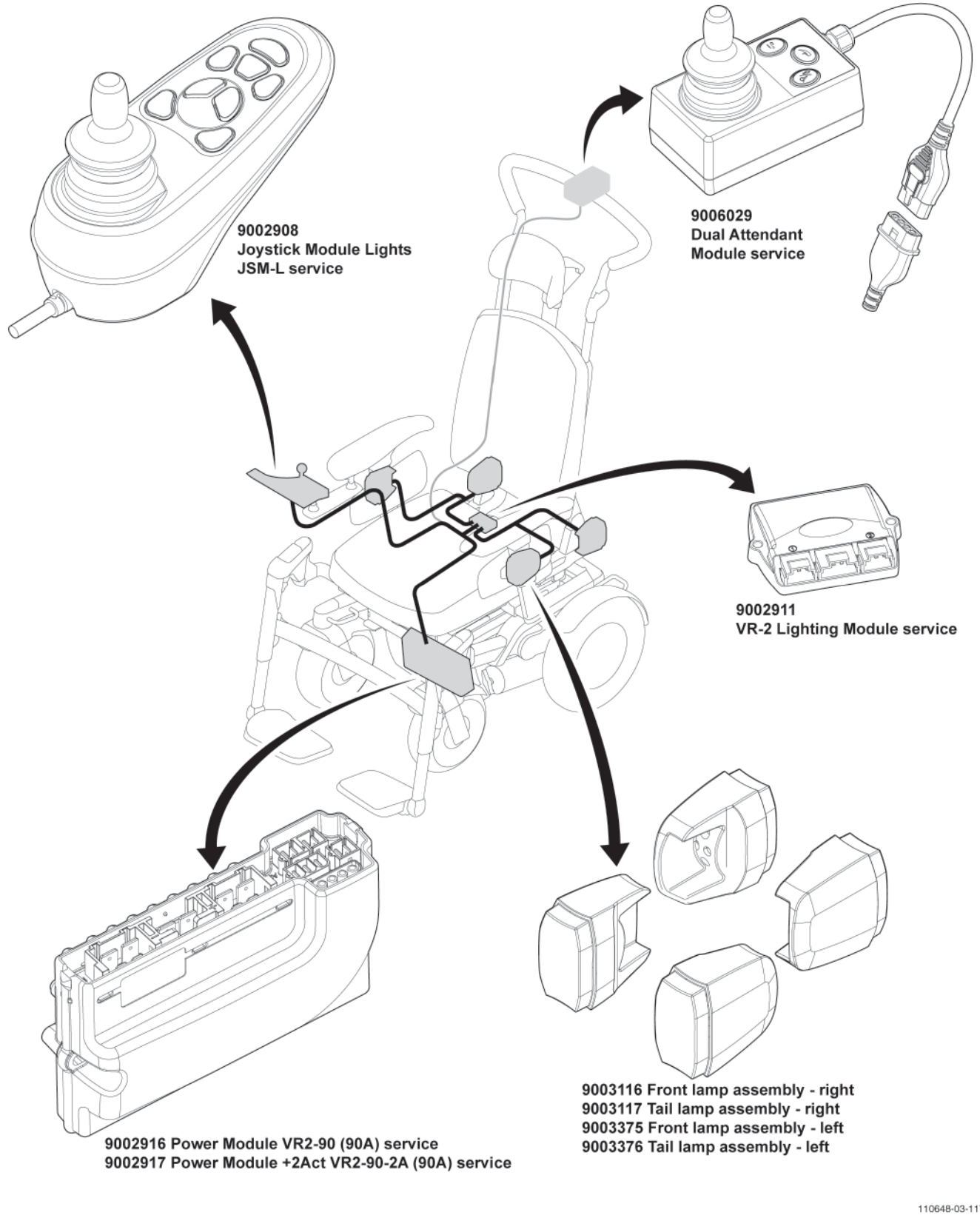
To determine the correct remote control, power module, bus and cables for the R-net system in all possible models, please follow the questionary in the R-net flowchart on page 25.

VR-2; drive only



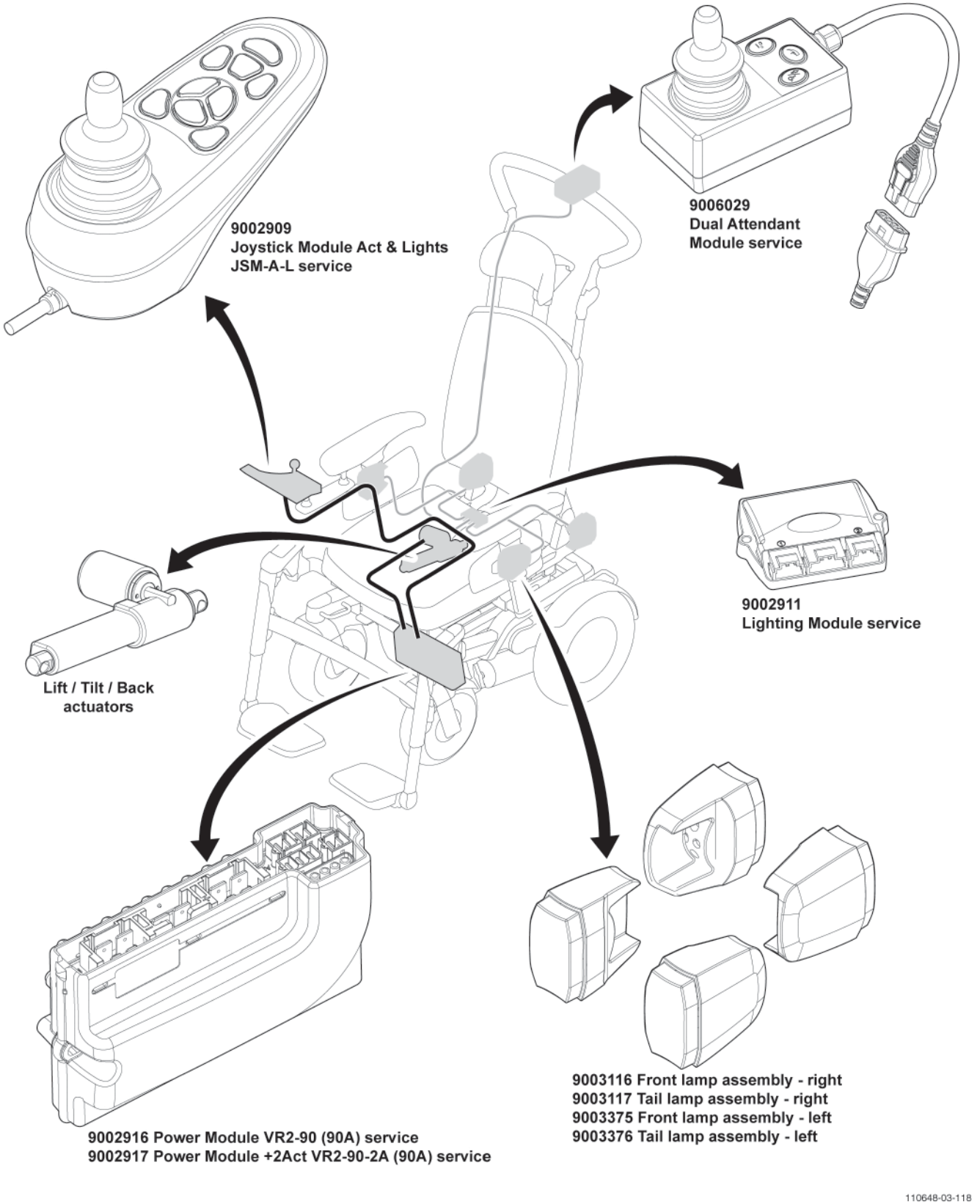
To determine the correct remote control, power module, bus and cables for the VR-2 system in all possible models, please follow the questionary in the VR-2 flowchart on page 29.

VR-2; drive & lights



To determine the correct remote control, power module, bus and cables for the VR-2 system in all possible models, please follow the questionary in the VR-2 flowchart on page 29.

VR-2; drive, lights & seats



To determine the correct remote control, power module, bus and cables for the VR-2 system in all possible models, please follow the questionary in the VR-2 flowchart on page 29.

8 Warranty

8.1 Provisions of warranty

In the warranty and liability provisions the following terms are defined as follows:
- **Product**: The manual or electric wheelchair or scooter manufactured and supplied by Handicare.
- **Customer**: The person who directly obtains a product from Handicare.
- **Dealer**: The person who supplies a product obtained from Handicare to third parties.
- **User**: The person who uses a product manufactured by Handicare.

Irrespective of what has been determined concerning warranty conditions in the general
terms and conditions applicable to the product, the following shall in any case apply with regard to the warranty:
1. Except insofar as described otherwise in the provisions below, Handicare guarantees the product for its suitability for the purpose for which the product is intended - all of these points as described in this manual - and for the quality of the material of which the product is made and the manner in which the product is manufactured.
2. Repairs or replacement of parts of the product that may be necessary as a result of faults that are based on qualitatively faulty material or manufacturing errors shall be carried out free of charge, as long as such faults occurred within one (1) year of the date of delivery of the product to the Customer. The parts to be replaced must be shipped post-paid to Handicare.

Disassembly or assembly of these parts shall be at the expense of the Customer.
Therefore the following cases shall not be eligible for free repair or replacement as referred to in the previous sentence:
A. Repair or replacement that is necessary in connection with faults that arise after one (1) year from the date of delivery of the product to the Customer;
B. Repair or replacement that is required in connection with faults due to improper or careless use of the product or that are based on the product being used for another purpose than the one for which it is intended, in which regard it shall apply that if the Customer is a Dealer, this Dealer shall indemnify Handicare against possible claims from Users or other third parties for faults based on an incorrect or careless use of the product;
C. Parts that are subject to wear, and the need for repair or replacement of the parts is the actual consequence of normal wear.

3. Irrespective of that stipulated under 2, as far as an electric product is concerned it shall apply that, with regard to the battery that forms part of the product, warranty is only given in case of faults or non-functioning of the battery that are demonstrably the direct consequence of material or manufacturing errors. A fault or non-functioning of the battery as a result of normal wear is not covered by the warranty as referred to in these warranty provisions. Similarly not covered by the warranty are faults or non-functioning that are the consequence of improper or unprofessional use of the product or the battery that is part of the product, including the incorrect charging of the battery and the failure to carry out timely and proper maintenance, in which context it shall also apply that if the Customer is a Dealer, this Dealer shall indemnify Handicare against possible claims from Users or other third parties that are based on the above-mentioned improper or unprofessional use of the product or the battery that is part of the product.

4. The warranty conditions as stated in the above provisions shall in any case become null and void if:
   A. Handicare's guidelines for the maintenance of the product have not, or have insufficiently, been followed;
   B. A necessary repair or replacement of parts is based on neglect, damage or abuse of the product or a use of the product for another purpose than the one for which it was intended;
   C. Parts of the product have been replaced by parts of another origin than those which Handicare uses and/or parts of the product have been replaced without the permission of Handicare.

5. The warranties as stated in provisions 1 to 3 also become null and void in the case of re-use by a new user within the warranty period and when such re-use necessitates adaptations to the product and those adaptations were not carried out on the instructions of and/or at the order of Handicare.

6. To retain rights under the above delineated warranties, the Customer must, in the case of damage or other calamities, contact Handicare as quickly as possible and provide Handicare with as much information as possible. The possibility of taking recourse to the above-mentioned warranty conditions shall in any case become null and void for the Customer after 20 workdays following the date of the claim incident or the calamity forming the basis for recourse to the guarantee.

7. The replacement of a part or the repair or the reconditioning of the product within the period a warranty period shall not extend the warranty period.

8. Handicare gives no warranty on repair to or reconditioning of the product carried out other than under order of and/or on the instructions of Handicare. If repairs and/or reconditioning are carried out by or on §behalf of a Customer, the Customer shall indemnify Handicare with respect to claims made by third parties which, in the broadest sense of the word, result from such repairs or reconditioning.

8.2 Liability provisions

Irrespective of what is determined regarding liability in the general terms and conditions applicable to the product, the following shall in any case apply with regard to liability:

1. Taking into consideration the following provisions, Handicare shall only accept liability for loss due to death or physical injury that is the result of a defect in the product for which Handicare is responsible and for damage to another object that is the private property of the user of the product, as long as said loss is the direct result of a fault in the product.
2. Handicare accepts no other or further liability than delineated under 1. In particular Handicare accepts no liability for consequential damage, in any form whatsoever.

Version	Page	Draw	Changes
2011 V1			
2012 V1	7		Added warning 'Interference between carrier and tilt module at the lowest seat height'
			Deleted Sedeo Lite and Pro part. Became a seperated manual.
	12	01	Added article numbers 1007080, 9006237, 00000.4042 and 00000.4035 (position 14a - 14d, socket head screws)
	13	02	Added article numbers 9002784, 9006360 and 9006452 (position 32, 37 and 38)
	14	03	Added article numbers 9006781 till 9006790 Motor 4-pole Alpine
	14	03	Added article numbers 9002784, 9006361 and 9005107 (position 39, 44a and 44b)
	15	04	Changed article number 9005987 castor wheels outdoor into right version and added 9006820 left version

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